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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

EDITED BY
THE HONORARY SECRETARIES,



JANUARY TO DECEMBER,
1878.



CALCUTTA :
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ERRATA.



- Page 41, 4th line from bottom, *dele* Refund of
Page 42, 10th line from bottom, *dele* Refund of
Page 46, 14th line from bottom, *for s read is*
Page 47, 21st line from top, *for in course read in the course.*
Page 51, 12th line from bottom, *for publications read publication.*
Page 57, 5th line from bottom, *for remaining read remainder.*
Page 57, 5th line from bottom, *for 5 read 5½.*
Page 56, 7th line from top, *for La Touch read La Touche*
Page 151, 2nd line from bottom, *for De Sacy read De Lacy*
Plate III should be Plate II.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

FOR JANUARY, 1878.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 2nd instant, at 9 o'clock P. M.

DR. RÁJENDRALÁLA MITRA, RAI BAHÁDUR, C. I. E., Vice-President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced :—

1. From Signor O. Beccari, a copy of his work entitled—

“Malesia; Raccolta di Osservazioni Botaniche intorno alle piante dell' Archipelago Indo-Malese e Papuano.”—Vol. I. fas. 2.

2. From the Right Hon'ble the Secretary of State for India, through the Military Department, Government of India, the following books published by the Hakluyt Society :—

Barent's three Voyages to the Arctic Regions. The Commentaries of the Great Afonso D'Albuquerque, by W. de Gray Birch. Vol. 2.

3. From the Government of India, copies of the following works by H. F. Blanford, Esq., Meteorological Reporter to the Government of India.

The Indian Meteorologist's Vade-Mecum, Pts. I, II. Tables for the reduction of Meteorological Observations in India.

The following gentlemen, duly proposed and seconded at the last Meeting, were elected Ordinary Members—

Lieutenant H. A. Sawyer, B. S. C.

Alexander Ward, Esq.

The following are candidates for ballot at the next Meeting—

Col. the Hon'ble Sir Andrew Clarke, R. E., K. C. M. G., C. B., proposed by Major-General H. L. Thuillier, C. S. I., seconded by Dr. Rájendralála Mitra.

The Hon'ble H. T. Prinsep, C. S., Calcutta, proposed by H. F. Blandford, Esq., seconded by H. H. Locke, Esq.

The Rev. C. A. Chard and Manockjee Rustomjee, Esq. have intimated their desire to withdraw from the Society.

The CHAIRMAN reported that the Council had transferred Rs. 1,26,700 to the Permanent Reserve Fund under Rule 67. This sum includes Rs. 2000 from Admission and Compounding Fees, funded before the receipt of the Rs. 1,50,000 from Government, and Rs. 2,782-13-7 since received on the same account. Of the sum forming the Permanent Reserve Fund Rs. 10,700 would be in 4 and $4\frac{1}{2}$ per cent., and the remainder in $5\frac{1}{2}$ per cent., as shewn in the accompanying list :—

$4\frac{1}{2}$	per cent.,	Nos. 046,454/011, 1830/ 1872,.....	Rs. 1,200
$4\frac{1}{2}$	„	„ 046,478/022, 559 „	4,500
4	„	„ 4537/7/4—077,963 1865,	500
4	„	„ 4538/ „ —077964 „	500
4	„	„ 4539/ „ —077965 „	500
4	„	„ 4540/7/4—077966/ „	500
4	„	„ 4541/ „ —077967 „	500
4	„	„ 4542/ „ —077968 „	500
4	„	„ 4553/ „ —078468 „	1,000
4	„	„ $\frac{043995}{8005}$ of 1859/60,.....	1,000
$5\frac{1}{2}$	„	„ 8269, 003890/002922 of 1859/60	10,000
$5\frac{1}{2}$	„	„ 8272, 043655 of 1859/60,	6,000
$5\frac{1}{2}$	„	„ 8273, 043654 of 1859/40,	10,000
$5\frac{1}{2}$	„	„ 8274, 043653 „	10,000
$5\frac{1}{2}$	„	„ 8275, 043652 „	10,000
$5\frac{1}{2}$	„	„ 8276, 043651 „	10,000
$5\frac{1}{2}$	„	„ 8282, 040385/007484	10,000
$5\frac{1}{2}$	„	„ 8283, 040384 „	10,000
$5\frac{1}{2}$	„	„ 8285, 040376 „	10,000
$5\frac{1}{2}$	„	„ 8286, 040375 „	10,000
$5\frac{1}{2}$	„	„ 8287, 038223/035082,,	10,000
$5\frac{1}{2}$	„	„ 8288, 029129/006278,,	10,000
			Rs. 1,26,700

Rs. 9,300 will thus be left funded in the Temporary Reserve Fund.

The CHAIRMAN also reported that the Council had appointed Mr. R. Lydekker, Member of the Council and Natural History Secretary in the place of Mr. Wood-Mason.

The Chair was then taken by the President, the Hon. SIR E. C. BAYLEY, K. C. S. I., C. I. E.

MR. W. T. BLANFORD exhibited the Geological map of Sind recently completed, and gave the following account of the Geology of the Province, which had been mapped in the course of the last three years by Mr. Fedden and himself.

The greater portion of Sind, including all the richer and more populous parts of the province, consists of the alluvial flat of the Indus, and is a portion of the great Indo-Gangetic plain of northern India. But to the west of the river, at a variable distance, barren rocky hills arise, in upper Sind consisting chiefly of a great north and south range, known as the Khirthar, which separates Sind from the Kelat territory, (or Balúchistán,) and in lower Sind, south of Sehván, of several minor ranges, having a general north and south direction. All these ranges, if of any height, consist chiefly of nummulitic limestone, and the ridges in Lower Sind are for the most part anticlinal rolls, higher beds occupying the intervening valleys. The Geology of the province is singularly simple, faults being rare, whilst the disturbance of the rocks is just sufficient to afford good sections, without rendering the relations of the beds so complicated as to be difficult to trace.

Until recently the Geology was chiefly known from the researches of Captain Vicary published no less than thirty years ago,* and these researches were limited to a very small portion of the province. The fossils collected by Captain Vicary and others were described and elaborately figured by MM. d'Archiac and Haime† in 1853, the whole of the marine fauna being supposed to be eocene. It was however subsequently shewn by Professor Martin Duncan‡ and by Mr. Jenkins§ that there was a mixture of later tertiary forms amongst the supposed eocene fossils, and it was noticed by Captain Vicary that above the marine beds were conglomerates and sandstones containing fossil bones.

Such was, in brief, the information available when the Survey was commenced, and the result of a more thorough investigation has naturally added much without depriving the earlier information of its value. Indeed the beautiful figures of d'Archiac and Haime's work have been of the greatest service in the field, by enabling us at once to identify many of the fossils found. The results of the first year's work have been briefly described on the Records of the Geological Survey,|| but much additional

* Quart. Journ. Geol. Soc., III, p. 334.

† Description des Animaux fossiles du groupe nummulitique de l'Inde.

‡ Ann. Mag. Nat. Hist. 3, XIII, p. 295.

§ Quart. Journ. Geol. Soc., XX, p. 45.

|| Vol. IX., p. 8.

information has since been added, the most important being the recognition of cretaceous beds at the base of the tertiaries, and the confirmation of the view before announced that a thin flow of basalt representing the Deccan traps underlies the tertiary rocks. The beds of Sind are now classified thus in descending order.

<i>Name.</i>	<i>Subdivisions.</i>	<i>Approximate thickness.</i>	<i>Supposed geological age.</i>	<i>Remarks.</i>
1. Alluvial &c.,	—	unknown	recent and post tertiary	—
2. Manchhar	{ upper —	5000	pliocene	apparently representative of the Sevaliks proper.
	{ lower —	3000 to 5000	lower pliocene or upper miocene	
3. Gáj	—	1000 to 1500	miocene	—
4. Nari	{ upper	4000 to 6000	lower miocene?	—
	{ lower	100 to 1500	upper eocene	—
5. Khirthar	{ upper	500 to 3000	eocene	Nummulitic limestone. The base not determined.
	{ lower	10,000 ?	do.	
6. Ranikot	—	2000	lower eocene	
7. Trapè	—	40 to 90	upper cretaceous	Representative of Deccan and Malwa trap
8. Cretaceous	{ <i>Cardita</i>	350 to 450	} cretaceous	base not exposed.
	{ <i>Beaumonti</i>			
	{ beds			
	{ Sandstones	700		
	{ Hippuritic	320		
	{ limestone			

The finest sections are exposed in the Khirthar range in Upper Sind, and from this range the name applied to the nummulitic limestone, which always forms the highest part of the hills, has been taken. On the eastern flank of the range, the Nari, Gáj, and Manchhar beds are seen successively dipping towards the Indus plain, whilst west of the range, in Kelat, lower beds come in, but these have hitherto only been examined very hurriedly in one spot, on the Gáj river, which traverses the main range by an impassable gorge. Some 10,000 feet of these lower beds are exposed, no base being seen, but nummulitic and other fossils were only found in the higher beds, the lower 5000 or 6000 feet being unfossiliferous.

The only other place in Sind where beds inferior to the nummulitic limestone were found to be exposed is in the nameless range of hills running south from Sehván. This range is sometimes spoken of as the Laki range, from the village of Laki, near the northern extremity. It appears to be part of the Hála range of Vicary and others, but the Hála range of the old maps included the Khirthar and several other ranges, and no distinct chain of hills is known by any such name in the country. There is however an unimportant pass in the Laki range known as Hála Lak (Lak = pass). Each separate peak of this range has its own name, no general term being applied to the whole. In this Laki range, however, beneath the nummulitic limestone, the lower eocene and cretaceous beds just noticed are well exposed.

In the south-western portion of the province the well-marked breaks between the different subdivisions of the tertiary series can no longer be traced. The massive nummulitic limestone, so conspicuous to the northward, becomes broken up into thinner beds intercalated with clays and sands, and finally disappears, and the higher tertiary groups all tend to pass into each other.

The lowest bed seen in the province, the Hippuritic Limestone, has only been found in one spot, and there the outcrop does not occupy much more than about half a mile in length. The only recognizable fossil found was a Hippurite. It is probable that this limestone is identical with the cretaceous limestone, which occupies a large area in Persia, and which has been traced at intervals from south-east of Karmán to the neighbourhood of Tehrán. If so, this is the first time that the formation has been recognized in India, except in the Himalayas. The bed consists of pale-coloured hard limestone, very gritty and sandy above, purer beneath.

Above the limestone there is a considerable thickness of dark-coloured sandstones, often of a purplish tint and frequently rather calcareous. These beds are not very fossiliferous, but towards the top they contain oysters and a few bones, apparently reptilian.

The next beds in ascending order consist of olive clays, shales and sandstone, frequently abounding in fossils, the most important being a peculiarly globose *Cardita*, *C. Beaumonti*, two or three species of *Nautili* and corals. The *Cardita* is allied to cretaceous species, and so is one, at least, of the *Nautili*.

The thin band of basaltic trap resting upon the *Cardita Beaumonti* clays, although less than 100 feet thick, is almost certainly identical with the great Deccan and Malwa trap formation, which covers so enormous an area in Western India, and which extends from Western Chutia Nágpur as far as Kachh. The belt in Sind has been traced for about 22 miles, always occupying the same position above the olive clays and beneath the

lowest tertiary beds. This trap is therefore clearly contemporaneous and not intrusive, and its geological position at the base of the very lowest eocene rocks, and immediately above cretaceous strata, corresponds exactly with the place in the series already assigned to the formation where far more fully developed in Málwa and Guzerat.

The Ránikot group consists of variegated sandstones and shales, with some bands of highly fossiliferous brown limestone in the upper strata. In the lower portion of the group only imperfect plant remains are found, a few dicotyledonous leaves being the only recognizable impressions, but the limestone abounds in *Mollusca*, *Echinodermata*, and *Foraminifera*. Nummulites are much less common than in the next group, the only abundant species being *N. Leymeriei*, but this, like several other Ránikot fossils, is found in the Khirthar beds also. A few forms with cretaceous affinities, *e. g.* a *Salenia* and some peculiar *Nautili* occur in the brown limestones, but the great majority of the species are eocene.

The beds hitherto noticed are confined to lower Sind, all except the Ránikot group being restricted to the Laki range, whilst the latter covers a considerable tract of country near Kotri and Tatta. The Ránikot beds in this part of the country are succeeded immediately in ascending order by the Khirthar Nummulitic limestone, which is locally unconformable, but generally appears to pass down into the underlying group. To the west of the Khirthar range however, on the Upper Gáj, as already mentioned, a succession of argillaceous limestones, shales and sandstones, resting upon unfossiliferous dark shales with limestone bands, is found, and the latter beds appear to be identical with the supposed nummulitic group, which occupies so large an area in Makrán, and which I once traversed throughout the greater part of the country between Gwádar and Jálk. This same lower Khirthar group, with its characteristic unfossiliferous shales and bands of limestone, is also found on the Habb river, west of lower Sind.

The nummulitic limestone of the Khirthar group is about 1200 feet thick at the Gáj, but apparently thicker to the northward, whilst in lower Sind it gradually thins out, becomes mixed with shales and clays, and towards the Habb river entirely disappears. Where best developed the Khirthar group is by far the most conspicuous formation in the province, and consists of very massive whitish and grey limestone, abounding in nummulites of several kinds and other foraminifera, corals and mollusca also occurring. The commonest species are *Nummulites granulosa*, *N. Biaritzensis*, *N. Leymeriei*, *N. spira*, *N. Ramondi*, *N. obtusa*, *Alveolina ovoidea*, *Orbitoides dispansus*, and *Nerita Schmedeliana*. The nummulitic limestone not only forms the crest of the Khirthar, but it is the most conspicuous rock in many of the minor ranges, and fragments derived from it are found in most of the recent and sub-recent gravels.

Above the white or grey nummulitic limestone, there are generally found some bands of brown limestone, also containing *Nummulites* and *Orbitoides*, but of different species, none of the forms so common in the Khirthar beds being found, but being replaced by an abundance of *Nummulites Garansensis*, *N. sublævigata* and *Orbitoides papyracea*. The latter is very characteristic, being very thin and often of large size, a diameter of two to three inches being not uncommon. *Nummulites sublævigata* is unknown in Europe. *N. Garansensis* there, as in Sind, belongs to the highest beds containing nummulites, and extends into the formations of the lower miocene period. With the brown limestones dark shales are associated, and these gradually pass up into a great thickness of unfossiliferous sandstones, forming the upper Nari group.

In the Khirthar range there is a sharp change from the Nari sandstones to the limestones of the Gáj group, but further south the passage is more gradual, bands of limestone with marine fossils being found here and there in the upper Nari beds. The Gáj group is highly fossiliferous, but no nummulites have been detected in it: an *Orbitoides*, apparently *O. papyracea*, is however found. Corals, echinoderms and mollusca abound in places and are exquisitely preserved; the most typical fossils are *Ostrea multicostata* and *Breynia carinata*, but *Clypeaster*, *Echinodiscus*, *Echinolampas Jacquemontii*, *Kuphus rectus*, *Venus granosa*, *Pecten Favrei*, *Turritella angulata* and *Balanus sublævis* are all common.

The highest tertiary group, to which the name of Manchhar has been given, is of immense thickness, in places approaching 10,000 feet from top to bottom. The lower subdivision consists of grey sandstones, with brown, grey and red clays, and a few conglomeratic beds containing fragmentary mammalian bones; the upper portion is chiefly composed of clays with subordinate beds of sandstone (though there is much variation in the relative development of argillaceous and sandy beds) and some conglomerates containing pebbles of nummulitic limestone, which have not been observed in the lower portion of the group. Capping the whole is a considerable thickness of coarse conglomerate. Bones are of very rare occurrence in the upper portion of the group. As a whole this important formation probably represents the Sevaliks of northern India, and some of the mammalia, identified by Mr. Lydekker, appear identical, but the genera represented are as a rule older, forms like *Dinotherium* and *Merycopotamus* prevailing and the only common living genus being *Rhinoceros*. This appearance of greater age is doubtless due to the lower horizon at which the fossils occur in Sind, where the ossiferous beds are near the base of the whole group, close to the miocene Gáj beds, into which there is a complete passage from the lower Manchhars, the passage beds containing estuarine mollusca, whilst in the typical Sivalik area the fossiliferous beds are near the top of the series.

The whole of the beds hitherto described have been disturbed and upheaved, shewing that great changes in the surface of the country, and in all probability in the distribution of land and water, have taken place since the close of the Tertiary period in Sind, as in the Himalayas.

Mr. LYDEKKER remarked that the investigation of the Sind Sivalik rocks was gradually bringing to light the remains of a very interesting mammalian fauna which once inhabited that area. The most interesting among these mammals, were a number of Pig-like animals,—some with complex and others with simple teeth,—which mostly belonged to a group which had now completely disappeared from the earth. Some of these animals belonged to genera which had been previously known from the eocene and miocene of Europe and America, while others belonged to new genera, which would subsequently be described by the speaker in the “*Palæontologia Indica*.”

Dr. RÁJENDRALÁLA MITRA submitted the following remarks on the early life of Aśoka. He said—Of all the ancient Indian monarchs whose monuments have come down to us, the Emperor Aśoka was the greatest. His sway extended from Kapurdegiri in the Eusafzai country to Dhauli in Cuttack, and from north Tirhút to the Peninsula of Guzerat. His anxiety for the good of his subjects was great, and his edicts show the intelligent interest he took in their welfare. He was, however, the least known by the people in the present day. As a renegade from the religion of his ancestors he was detested by the Hindus, and nowhere noticed in their ancient records; and the Buddhists, whose ranks he joined, having been expelled the country, could not keep his name alive in India. To the Hon’ble Mr. Turnour of Ceylon belongs the credit of first bringing his name to the notice of European Orientalists; and the identification by our James Prinsep of the name with the Piyadasi of the Láṭ inscriptions, laid the groundwork of the historical chronology of ancient India. Next to the identification, made by the founder of this Society, of Chandragupta with the Sandrocottus of the Greeks, it was of the highest importance. The next important event in connexion with the history of Aśoka was the discovery of the Sanskrit Buddhist Literature of Nepal. For it too are European scholars indebted to one of our most distinguished associates—distinguished alike for his literary and scientific researches—who first unlocked the storehouse of Nepalese Buddhism. Mr. B. H. Hodgson, to whom the speaker referred, collected three sets of MSS. of this literature, one of which he presented to this Society, another to the Royal Asiatic Society of Great Britain, and the third to the Asiatic Society of Paris. The first of these remains yet untouched; the second has the benefit of only a nominal catalogue; but the third fell into the hands of that profound scholar,

Eugène Burnouf, who drew from it the materials of his invaluable *Histoire du Bouddhisme Indien*. In that work the learned savant notices three MSS. bearing on the life of Asoka. One of them is named *Avadána Sataka*, but of it he gives no analysis. According to its name it should contain a hundred legends, but the MS. of it in the Society's Library comprises only ninety tales; and these do not refer to the history of Asoka. The second work is the *Divya Avadána*. It is a prose work, devoted entirely to the life of Asoka, and Burnouf has supplied a complete translation of it; but the Library of the Society does not possess a MS. of it. The last is the *Asoka Avadána*, and of it the following is a brief abstract. It extends to 276 folia, and comprises about ten thousand anushtup verses. Its author's name is not given; but it professes to have been related by one Jayaśrí to his disciples at the Kukkuṭa Vihára, in a garden named Upakaṇṭhikárâma, on the right bank of the Ganges near Pátaliputra. The authority quoted is that of a saint named Upa Gupta, the spiritual guide of the king. The first hundred and five folia of the work are devoted to the life of Asoka, and the rest is made up of tales and anecdotes said to have been related by the saint for the edification of his royal pupil, and to illustrate the morality of the Bauddha religion.

The work opens with the genealogy of Asoka from Bimbisára, king of Rájagriha, who was a contemporary of S'akya. The lineal descendants of Bimbisára were—

- | | |
|---------------|-----------------|
| 2. Mahipála. | 7. Turakuri. |
| 3. Udayis'a. | 8. Mahámaṇḍala. |
| 4. Muṇḍa. | 9. Prasenajit. |
| 5. Kákavarṇí. | 10. Nanda. |
| 6. Sahali. | 11. Vindus'ara. |

These names occur in the life of Asoka given in the *Divya Avadána*, except the 2nd, 3rd, 4th and 7th, which have been differently given, Ajátaśatru appearing for Mahipála, Udayin for Udayis'a, Muyin or Udayibhava, for Muṇḍa, and Tulakuchi for Turakuri or Turakuvi. In the absence of necessary MSS. it is impossible to ascertain how far these differences are due to copyist's errors. Apparently they are. The lists given in the Páli annals and in the Vishṇu Purána are more seriously discrepant. They stand thus :—

Vishṇu Purána, Vol. IV, pp. 180-186.

1. S'isunága.
2. Kákavarṇa.
3. Kshemadharman.
4. Kshattraiyas.
5. Vidmisára, or Bimbisára.
6. Ajátaśatru.

Maháwanso, pp. 15-20.

1. Ajátasattu.
2. Udayibhaddhako.
3. Anuruddhako.
4. Muṇḍo.
5. Nágadasako.
6. Susunágo.

- | | |
|-----------------------------------|--|
| 7. Darbhaka. | 7. Kálásoko. |
| 8. Udayásva. | 8. Ten sons of the last, no
name given. |
| 9. Nandivardhana. | 9. Chandagutto. |
| 10. Mahánandi. | 10. Bindusáro. |
| 11. Sumálya &c., the nine Nandas. | |
| 12. Chandragupta. | |
| 13. Vindusára. | |

The other Purāṇas give many different versions of the names above noted, (see Mr. Hall's Notes in *loco cit.*). The Páli names are obviously not so authentic as the Buddhist ones from Nepál. The latter were very early translated into the Chinese, and have therefore better claim to confidence. At the same time it should be observed that the omission of the name of Chandragupta from the latter is significant. Coupled with the fact mentioned by the Nepalese writer that Vindusára came to Pátaliputra from Rájagriha, it suggests the idea that Chundragupta was the sole king of his race, and that the Mauriya line commenced and ended with him. The Páli annals make Vindusára the son of Chandragupta. If so, he could not have come from Rájagriha to take possession of his ancestral capital of Pátaliputra. This is, however, not the place to enter into a discussion on the subject.

According to the work under notice, Vindusára of Rájagriha became the king of Pátaliputra, and his eldest son was Susíma. When Vindusára was reigning at Pátaliputra, a Bráhmaṇ of Chámpápuri presented him a daughter named Subhadráṅgi. The damsel was extraordinarily beautiful, and, a soothsayer having foretold that she would be the wife of a great king and mother of a universal monarch, the father made the present with a view to help the prophecy. The immediate fruit of this presentation did not, however, prove satisfactory to Subhadráṅgi. Immured in the palace, she was, through the jealousy of the princesses of the zenana, doomed to menial service. Among other low occupations she was ordered to acquire the art of a barber, whereby, she was told, she would gain the goodwill of the king. When well proficient in the art, she was ordered by the princesses to go and shave the king. She did so, and acquitted herself so well that the king offered to grant her any boon she wished. She prayed for his society; but the king denounced her on account of her being of the low caste of a barber. She explained that she was only acting the part of a barber by order of the princesses of the palace, but that she was a Bráhmaṇi by birth, and had been presented to the king expressly with a view to his marrying her. The king, thus reminded of her history, granted her wish, and made her the chief queen of the palace. Aśoka was the first fruit of this union. He was so named because the mother emancipated herself from her sufferings by his birth, the word meaning "griefless." The lady had a second son named Vítaśoka or Vigataśoka, which word has a similar

meaning. Áśoka was uncomely in his person, and that was the cause of his not winning the affection of his father. His conduct too was repulsive. He was so very unruly and troublesome, that he got the nick-name of *Chañḍa* or 'the violent.' His father made him over for training to an astrologer, named Pingalavatsa, who foretold, after casting various kinds of lots, that the boy would succeed his father on the throne of Páṭaliputra.

When the prince had attained his majority, his character did not mend; he was found so troublesome, that it was deemed advisable to get rid of him by deputing him to quell a mutiny which had broken out at Takshaśilá, at a great distance from the seat of the empire. His efforts, seconded, according to the text, by a divine declaration resounding in the air and certain celestial arms dropped therefrom for his use, proved successful, and he was well received by the people of that place. In the meantime his elder brother Susíma created disturbances at Páṭaliputra, and offended the chief minister, through whose intrigue he too was sent to Takshaśilá, and Áśoka was recalled therefrom.

Soon after, the king fell ill, appointed Áśoka, through the instigation of the minister but much against his own will, regent during the absence of his eldest son Susíma, and died. Áśoka was immediately after anointed and placed on the throne. Susíma, on his return, disappointed of his patrimony, rose against his younger brother, and attacked Páṭaliputra; but Áśoka, through his able minister Rádha Gupta, overpowered him, and, to prevent future disturbances, ordered his ministers "to lop off the heads of all the trees in the royal garden with their flowers and fruits," in the same sense in which Tarquin the Proud lopped off the heads of the "tallest poppies" in his garden, to instruct his son as to what he should do. The ministers demurred, and so he himself struck off their heads, and, retiring to a garden with the ladies of the palace, enjoyed for a time the pleasures of life to the utmost.

Noticing one day that some of the ladies had broken the branches of an Áśoka tree, (*Jonesia Asoka*) he was very much annoyed, and directed a wicked man named Chaṇḍagirika, "the fierce mountaineer," to burn them to ashes on a large fire, and this was immediately done. The mountaineer, however, soon after met his deserts. Sárthaváha, a rich merchant, had proceeded to sea in the company of a hundred other merchants, and there had a son born unto him, who was named Samudra. On his way home, after twelve years, falling into the hands of pirates, he was deprived of his effects, and murdered along with all his companions. His son Samudra alone escaped, and led the life of a Buddhist beggar. Once he came to the house of the mountaineer to beg alms, and was set upon, but could not by any means be murdered. Surprised at it, the mountaineer reported the circumstance to Áśoka. The king came to see the strange beggar, heard everything from him, and then cut off the head of the mountaineer.

The miracle wrought by the beggar worked on the mind of the king ; and he became attached to the religion of Buddha. By the advice of a Yati named Yaśas, he caused a chaitya to be erected at the Kukkuṭa garden, and deposited in it some relics of Buddha. He then caused a chaitya and other religious edifices to be erected at Ramagrāma. Coming thence to the river Ganges, he was requested by the Nagas to go to their country, and there he caused religious edifices to be erected. At the request of the people of Takshaśilā, he caused 3,510,000,000 stupas to be erected for the deposit of relics. By his order the Yakshas erected, on the shores of the sea, ten million stupas for the same purpose. These religious acts endeared him to the people, who dropped the use of the old nick-name of Chanda, and called him Dharmāsoka or "Aśoka the virtuous."

After this a son was born unto him named Kunāla *alias* Dharmavardhana, who soon distinguished himself in all that was taught him, and was carefully brought up as a follower of the Buddhist religion.

Subsequently, on one occasion Aśoka went to a Yati, at the Kukkuṭa garden, to study the true religion, and, at the suggestion of that recluse, sent for, from the Urumuṇḍa Hill, a Yati named Upa Gupta, to whom he assigned the monastery of Veṇuvana, or the "Bamboo Grove." This saint was the son of one Gupta, a rich man of Mathurā, who had been converted by one Śoṇavāsī, a mendicant who resided on the Urumuṇḍa Hill, and had presented his three sons, As'va Gupta, Dhana Gupta and Upa Gupta, to his tutor. A prophecy of Buddha is quoted, according to which the birth of Upa Gupta was to take place a hundred years after his demise (*mama nirvritimārabhya s'atavarshagate upaguptanāma bhikshurutpatsyati*. Fol. 23-24). This chronology, however, does not accord with the statement that As'oka was the thirteenth from Bimbisāra, a contemporary of Buddha. A contemporary of Aśoka could scarcely be born within a hundred years of the reformer's death. Such a prophecy, however, was needed to exalt the rank of the great teacher who became the spiritual guide of so mighty a sovereign as Aśoka. Having studied Buddhism under this tutor, Aśoka, under his guidance, went on a pilgrimage to all the principal holy places, visiting the tree under which, in the Lumbini garden, Buddha was born, the places sanctified by the saint's youthful sports, and the tree under the shade of which he performed his long protracted penance. This last tree is named Jambu briksha, (*Eugenia jambulana*) and not, as is usually believed and elsewhere described, an Asvatha. At all these places Aśoka caused a Maṭha or monastery to be established for the adoration of the "Three jewels."

When the teacher retired to his own hermitage, Aśoka caused a proclamation to be issued, declaring Buddhism to be the religion of his country ; and devoted all his wealth to the propagation and glory of his new religion,

and particularly in the embellishment of the Bodhi Tree, or the Tree of Knowledge, at Buddha Gayá ; but the name of the place is not given in the text. His chief queen Pavishyarakshitá was, however, annoyed at his forsaking the old family religion, and, finding that she was neglected, employed a secret agent, a Chandáli named Mátan̄gí, to destroy the sacred tree. The woman employed her sorcery and medicines to bear on the task, and the tree soon withered up. News of this sad occurrence was brought to Aśoka, and he was deeply grieved. The queen tried her utmost to cheer him, but he was inconsolable. At last she employed her secret agent to revive the tree by her magic arts, and this was soon effected. Thereafter the king devoted five years to the society of the Buddhist congregation. He deputed Supiṇḍola Bharadvāja, a Yati from the Mándár Hill, to preach the true religion everywhere over his empire, and celebrated, with great pomp, the quinquennial humiliation and conference, giving a great profusion of wealth, raiment and food to the clergy.

About this time he also celebrated the marriage of his son Kunála with a maiden named Kánchanamálá, and soon after deputed the son to quell an insurrection in Takshaśilá, a distant province, which seems to have been ill at ease under the house of Bimbisára. Kunjarakarna, the chief of the rebels, succumbed to the powerful army which followed the prince, and peace was soon restored. The insurrection, however, would appear to be a feint, and the real reason, as in the case of Susíma and Aśoka himself, was the removal of a troublesome prince from near the throne. It is stated, apparently by way of euphemism, that soon after the deputation, the king saw, in a dream, the prince's face all pale, haggard, and dried up, and, being informed by astrologers that that portended one of three things, *viz.* loss of life, retirement from the world as a hermit, or loss of sight, was greatly grieved, and neglected all his regal duties. One of his queens named Tiśyarakshitá, who was a step-mother of the prince, heard of this, and thinking it a good opportunity for her, undertook the superintendence of all business of the court, issuing orders and herself signing and sealing all despatches. She caused a letter to be written to Kunjarakarna and impressed it with the royal signet, directing Kunjarakarna to deprive the prince of his eyesight, as the least of the three evils. Kunjarakarna was at a loss how to carry out the order. The prince heard of the mandate, and had it duly carried out through the instrumentality of a Chandála—the task having been held as too cruel to be executed by any person of a higher caste. He then assumed the garb of a beggar, and secretly left Takshaśilá to roam about the country. In the course of his peregrinations he came to Pátaliputra, and one night took shelter in the royal elephant stables, where at midnight he amused himself by playing on a flute. The king, from his chamber, heard the music, and was charmed

by it. Next morning he sent for the musician, and recognised in him, his only son. Explanations followed, and the king, in a fit of anger, took up his sword to behead the wicked queen; but the youth interceded in the name of Buddha, and pacified him. This act of mercy for an enemy brought on a miraculous restoration of his sight.

Subsequently, seeing the earnest devotion of the king for the diffusion of Buddhism in his kingdom, certain Tīrthikas urged on Vítasoka, the king's brother, to refuse to accept the new religion. The king had tried his utmost to induce his brother, but failed. The king's minister then set about the task, and by offering him the kingdom made him a convert, and installed him king. Aśoka was greatly annoyed at this, and ordered the usurper to be immediately beheaded; but, through the intercession of the minister, a respite was granted for seven days, after which the prince flew to the shelter of Upa Gupta, and afterwards accepted from Guṇákara, a disciple of that teacher, consecration as a houseless hermit. This renunciation of the world did not, however, enable him to escape with his life. It so happened that at this time a professor of the Nirgrantha school, who reviled the religion of Buddha, had got a picture painted, representing himself with the likeness of Buddha lying at his feet, and this he had circulated widely in the province of Puṇḍravardhana, and Aśoka, hearing of it, had proclaimed a price (some dinars) on his head. A cowherd (Ábhíra) had heard of this, and one night taking Vítasoka, with his long beard, matted hair, and unkempt nails, to be the Nirgrantha, cut off his head, and presented it to the king with a view to obtain the promised reward. The sight of the head deeply grieved the king; and he sought from Upa Gupta, his spiritual guide, religious consolation for his many acts of cruelty. It is scarcely necessary to observe that this story contains the germ of a fratricidal war in which Vítasoka had been set up by the conservatists of the time to oppose the Buddhist reforms of Aśoka, and which, after a few days, terminated in the overthrow of the malcontents.

The history of Aśoka is concluded here, and the rest of the work is made up of moral tales related by Upa Gupta for the edification of the king. Nothing positive is anywhere said in it as to what was the religion of Aśoka before he accepted Buddhism. The belief, however, had until lately been general that he was a Hindu, and it was supported by the Páli annals of Ceylon, which describe him to have followed the doctrine of the Bráhmans. An essay, however, has appeared in which Mr. Thomas demurs to this conclusion, and marshals, in dense array, a large mass of evidence to show that he was a Jain. As the work of a profound scholar, *facile princeps* in the department of Indian numismatology, and thoroughly conversant with the antiquity and history of India, the essay deserves the highest consideration; and the ability and tact with which the evidence has been set forth leave no

room to doubt that in this country Jainism was a prevailing religion in the time of Aśoka and for some time before it. But it must be added that there has not been a single fact adduced which could directly bear upon the early religion of the author of the rock and the Láṭ edicts. It is abundantly evident from the edicts that Aśoka did forsake one religion and accept another; but what it was he forsook, the edicts do not say. There is one passage in these edicts, however, which affords circumstantial evidence of great importance. Mr. Thomas has carefully analysed the whole of the edicts, and described at great length their scope and purpose, but the particular passage to which the speaker referred had been somehow all but entirely overlooked. The passage referred was the last paragraph of the first Tablet, and in adverting to it, Mr. Thomas simply quotes these words: "This is the edict of the beloved of the gods Rájá Piyadasi—the putting to death of animals is to be entirely discontinued." Now the passage, as rendered by Prinsep, runs thus—"Formerly in the great refectory and temple of the heaven-beloved king Piyadasi daily were many hundred thousand animals sacrificed for the sake of meat food. So even at this day, while this religious edict is under promulgation, from the sacrifice of animals for the sake of food, some two are killed, or one is killed;—but now the joyful chorus resounds again and again—that from henceforward not a single animal shall be put to death."* In the revised version of Professor Wilson, this passage runs as follows: "There is but one assembly, indeed, which is approved of by the Rájá Piyadasi, the beloved of the gods, which is that of the great kitchen of Rájá Piyadasi, the beloved of the gods; every day hundreds of thousands of animals have been slaughtered for virtuous purposes, but now, although this pious edict is proclaimed that animals may be killed for good purposes and such is the practice is not determined, these presents are proclaimed that hereafter they shall not be killed.†"

Dr. Mitra was not satisfied with the second version, as it made the king declare "that the only assembly he approved of was 'his' own great kitchen." The worst of gourmands would have scarcely said so in a royal edict. It was, however, not necessary to discuss the question; it was enough for the purposes of the speaker that both versions admitted that hundreds of thousands of animals were at one time sacrificed for human food in the kitchen of Aśoka; and this fact, he held, was sufficient to show that that monarch at the time could not have been a Jain. The philosophical character of Jainism allied it very closely to Vedántism, and in that respect it could well pass for a Hindu form of faith. Its belief in the Tirthankaras, or incarnations of the Godhead for the redemption of sinners and the spread of the true religion, also brought it into close relationship

* Journal As. Soc. VII, p. 257.

† Jour. Roy. As. Soc. XII, p. 164.

with the religion of the Bráhmans. But it set itself in antagonism to Hinduism, the old faith of the country, by denouncing the Vedas as false, and the sacrifices enjoined in them as mischievous and sinful. A hypertrophy of the feeling of mercy for animated creatures, forms its cardinal point. It might be that originally this feeling was not carried to the absurd extent which resulted, to quote the vivid language of Mr. Thomas, in "devices of Hospitals for the suffering members of the brute creation, and ultimately, in after times, progressing into the absurdity of the wearing of respirators and the perpetual waving of fans, to avoid the destruction of minute insect life. An infatuation, which eventually led to the surrendering of thrones and kingdoms, to avoid a chance step which should crush a worm, or anything that crept upon the face of the earth ; and more detrimental still, a regal interference with the every-day life of the people at large, and the subjecting of human labour to an enforced three months' cessation in the year, in order that a moth should not approach a lighted lamp, and the revolving wheel should not crush a living atom in the mill."* But it is impossible to conceive a form of Jainism which tolerated the daily sacrifice of hundreds of thousands of animals for meat food or religious worship. From its very conception Jainism, like Buddhism, was a protest against the sacrifices of the Vedas. At a time when the Vedic ordinances enjoined hecatombs of cattle as the means of salvation, and the cruel practice of driving wooden spikes into the hearts of the victims as the orthodox mode of slaughter, such a protest was not only needed, but could not but most effectually appeal to the feeling of the public, and ally it on its behalf. This protest apart, there would be no *raison d'être* for Jainism ; and to suppose therefore that Aśoka, as a Jain, could, for purposes of *pūja* and food, daily sacrifice hundreds of thousands of animals, would be to assume a gross inconsistency. As a Hindu, following the canons of the Kalpa Sūtras, he could do all that and more most appropriately ; and the presumption therefore would be strong, that he was a Hindu following the Hindu faith when he indulged in those sacrifices, and became a Jain, or a Buddhist, when, in the 10th or 12th year of his reign, he prohibited those sacrifices. This would be a much more reasonable solution of the question, than the supposition that, notwithstanding his Jainism, he had, from the heedlessness of youth, or the love of "cake and ale," indulged in transgressions of the rules of his ancestral faith.

Such a solution would, likewise, be in keeping with the accounts of the Páli annals of Ceylon, which in a case of this kind, was more reliable than deductions founded upon monograms and mystic symbols of doubtful significance, and of such extensive currency that their

* Journal Roy. As. Soc., IX, p. 189.

testimony could not be of any use in settling the question. The most important of these symbols was the *svastika*. It was unquestionably held in great veneration by the Jains ; but, as shewn elsewhere (Proceedings for June 1877), it was held in equal esteem by the Hindus, and was well known to, and used by, the Greeks, Romans, Egyptians, Assyrians and other nations of antiquity. Mr. Thomas is of opinion that the Páli annalists of the 5th century, living years after the event, could not be expected to afford the best evidence on the subject. "Under any circumstances," he observes, "their testimony would not carry much weight in the argument about other lands and other times, and it is moreover, a crucial question as to how much they knew about Bráhmanism itself, and whether the use of the word Bráhmanism does not imply merely, in this sense, a non-Buddhist or any religion opposed to their own."* This assumption of the ignorance of the Sinhalese annalists as to the true nature of Bráhmanism is, however, gratuitous. There is nothing to justify it: on the contrary much in their writings to show that they were perfectly familiar with it. Their intercourse with the people of the Coromandel Coast gave them ample opportunities to know the nature of Bráhmanism ; and Bráhmanism in the South did not, in the 5th century, differ much, if at all, from that of the North.

As a collateral evidence of much weight in the case, Dr. Mitra read from the *Áśoka Avadána*, an extract in which are described the means which certain Tírtthikas are said to have adopted for checking the progress of Buddhism, and persuading Vítaśoka, the younger brother of Áśoka, not to adopt the religion of Buddha which his brother was promulgating, and to rise in rebellion against him. It runs thus—

"Beholding this (the attention paid by Áśoka to the dissemination of the Buddhist creed), these arrogant Tírtthikas, oppressed by the fire of envy, collected together, and said to each other: 'Should this king Áśoka continue a worshipper of Buddha, all other persons, encouraged by him, would likewise become followers of Buddha. None among the people will be devout; none of the good Śrávakas will listen to us with respect. We should therefore, for the promotion of honor and fame, always adopt such means as will make us fully trusted.' Excited by this speech, the arrogant Tírtthikas came to the resolution of adopting immediate action. Then these Tírthis went from house to house of well-disposed people, and, blessing them, thus addressed them: 'Honorable sirs, listen to us if you wish for your own good. Should you wish for a blessed hereafter, devote yourself to the true religion. Ours is the true religion, and therefore attend to it with all respect. The religion of the Bauddhas is not the true one, for it provides no salvation (*moksha*).' Hearing these words some were convinced, others vacillated, and some would not believe them at all. Thus those

* Journal Roy. As. Soc. IX, p. 181.

Tíর্থikas, wishing for honors daily seduced credulous people. Then those arrogant ones, longing for fame and respect, proceeded to visit Vítaśoka, the brother of Aśoka. Appearing before Vítaśoka, the son of Vindusára, they blessed him, and stood in front of him. Vítaśoka, seeing them in front of him, saluted them, and enquired the object of their visit. 'Reverend sirs, what has brought you so anxious to this place? You are always welcome to relate whatever you wish.' Thus encouraged those arrogant Tíর্থikas, looking at each other, thus addressed the prince: 'May success always attend you, great king (*Maharája*); may you always prosper; may you be free from all fear. Since we have come to advise you for your good, it is meet that we should tell you all. Should you wish for a blessed hereafter, listen to our advice. Ours is the true religion, alike salutary here and hereafter. Those who know best declare it to be the best of all systems of religion. Therefore, O learned king, believe in it, listen to our religion, and follow it with ardour. Then every thing will prosper about you; and, overcoming all your enemies you will become a universal monarch, (*Chakravartí*). The religion of the Bauddhas is not true, for it offers no salvation (*moksha*). Therefore that religion should never be listened to. Since those shaven-pated, vile destroyers of their family preach a false religion, overthrowing all caste and all duty—men, devoid of the religion of the Vedas, un-Bráhmancial in their conduct, and vilely passionate—they should, O king, on no account be respected by you. No Bauddha should be revered, nor seen, nor touched, nor worshipped, nor spoken to, nor dwelt with in the same house, nor visited by any one. You should on no account eat with them, nor present anything to a Buddhist sanctuary. Even when by mistake men listen to the doctrines of the Bauddhas with regard, they suffer from various calamities, and at last repair to hell. Hence, O king, should you wish for a blessed hereafter, never listen to the doctrines of the Bauddhas with respect. Should by delusion, one, looking at the merits of their religion, accept it, he, fallen here, will be translated to hell hereafter. For these reasons, O great king, accept not the doctrine of Buddha, but, abiding by our canons, follow the true religion with devotion. By so doing you will here and hereafter enjoy great blessings. No evil shall ever befall you, and you will proceed on by the true path. Listening to our words, weigh well, which is good and which is evil, and for your own advantage follow the path of duty.' Vítaśoka heard this address of the Tíর্থikas, but remained unconvinced of their truth. The Tíर्थikas addressed him again and again, and at last brought him convinced, under their control.'*

* तदा ते तीर्थिकाः सर्वे तद्गृहा येऽभिमानिनः । ईर्ष्याग्नितापितास्तत्र सम्मिश्रितं वभाषिरे ॥
भवन्तो यदयं राजा ह्यशोको बुद्धसेवकः । तथानुमोदिताः सर्वे भवन्ति बुद्धसेवकाः ॥

Now, this extract is from one of the works, which, according to Mr. Thomas, are “ data, contributed from the very *nidus* of Buddhism in Magadha, whose passage into the ready refuge of the valley of Nepal, would *primā facie* have received an unadulterated version of the ancient *formulae*, and have supplied a crucial test for the comparison of the southern developments,

तद्वचो बोध्याः केचिद् भवन्ति अथवा तथा । इमे स्वभावकाश्चापि न शृण्वन्ति समादरात् ॥
तद्वचं सर्व्वथा सर्व्वे यशोमान्यप्रहृदये । कुर्व्वीमहि तयोपायं यथा स्यामः प्रमादिकाः ॥
शुभेति तीर्थिकाः केचिद्यशोमानाभिस्त्राससाः । तथेति सम्मतं कृत्वा कर्त्तुमेवं पुरेऽचरन् ॥
तत्र सर्व्वत्र ते तीर्थ्याः अदासूनां गृहं प्रति । ब्रह्मशीर्वचनं दत्त्वा पुर एव समग्रवन् ॥
भदन्ताः श्रवतां सर्व्वे यद्वितं वः प्रचक्षते । यद्यस्ति सुगतौ वाञ्छा तत् सुधर्मो प्रसीदत ॥
अस्माकमेव सद्वर्त्मसूदनं शृणुतादरात् । बौद्धानां न हि सद्वर्म्मो यतो मोक्षो न विद्यते ॥
इति तैर्मदितं श्रुत्वा केचिलोकाः प्रबोधिताः । केचिद्दोषायमानाश्च केचिन्नैव प्रतीतितः ॥
तथा ते तीर्थिकाः सर्व्वे अदासुषु जनेष्वपि । मान्यसुब्धाः प्रभावन्ते प्रचरिरे दिने दिने ॥
व्रतस्ते मानिनः सर्व्वे यशोमान्याभिस्त्रासिनः । अशोकभातरं वीतशोकं ब्रह्ममुपाचरन् ॥
तत्र वे वीतशोकं तं विन्दुसारवपात्मजं । इष्टाशीर्वचनं दत्त्वा पुर एव समाश्रयन् ॥
व्रतस्थानं समुपासीमान् वीतशोको निरीक्ष्य सः । प्रहृत्य विनयं कृत्वा पप्रच्छागतिकारणं ॥
अत्रवक्तः किमर्थं वो यदिहामच्छादरात् । यदिच्छितं तदस्मापु वक्तुमर्ह्य सर्व्वथा ॥
इति तैर्मदितं श्रुत्वा ते तीर्थ्या अभिमानिकाः । परस्परं समाश्लोक्य तं वपात्मजमश्रुवन् ॥
अथोऽस्तु ते महाराज प्रसीद हितमृद्गव । यद्वचं ते हितं वक्तुमिच्छायामः समादरात् ॥
तदस्माभिर्हितं वाक्यं वक्तव्यं हि प्रचक्षते । यद्यस्ति सुगतौ वाञ्छा तदस्माकं वचः शृणु ॥
अस्माकमेव सद्वर्म्ममिहामुच्यमानं । सर्व्वधर्म्माधिकं प्रोक्तं सर्व्वशास्त्रेषु तद्विदैः ॥
तस्माद्राजन् महाविघ्नं विदित्वैव प्रमादय । अस्माकं समाकर्ण्य भज नित्यं समाहितः ॥
तथा ते X मसं नित्यं सर्व्वथापि भवेद्भुवं । सर्व्वारींश्च विनिर्जित्य चक्रवर्त्ती भवेरपि ॥
बौद्धानां न हि सद्वर्म्मो यतो मोक्षो न विद्यते । तस्मात्तद्वर्म्मा नैव श्रोतव्या हि कथञ्चन ॥
यतस्ते मुचिता अष्टाः स्रक्कुलधर्म्माग्रकाः । मिथ्यधर्म्माभिवादन्ते जातिधर्म्मसमुत्क्रिताः ॥
वेदधर्म्मवर्द्धिताश्च अत्रास्त्रा विचक्षिकाः । अनाचारा अशुद्धाश्च अशुचिव्रतचारिकाः ॥
तस्मात्ते भवता राज्ञा नैव मान्याः कदाचन । वन्दनीया न ते बौद्धा दर्शनीया न केनचित् ॥
नापि सुगमा न पूज्याश्च सम्भाष्या नैव तैः सह । न स्यातव्यं न गन्तव्यं भोज्यं नापि सर्व्वथा ॥
किञ्चिदपि न दातव्यं बुद्धक्षेत्रे कथञ्चन । प्रमादादपि बुद्धानां शृणुयुर्धर्म्ममादरात् ॥
ते सर्व्वे नरकं गत्वा दुःखानि सर्व्वदाप्नुयुः । तस्माद्राजन् स्वयं तेषां बुद्धानां धर्म्ममादरात् ॥
श्रोतव्यं नैव कुचापि यदि सङ्गतिमिच्छते । यदि मोहाद्गुणश्लेषां इष्ट्वा धर्म्मं प्रमादयेत् ॥
स इहापि परिभृष्टः परत्र नरकं व्रजेत् । इति हेतोर्महाराज सा भज बुद्धशासनं ॥
अस्माकं शासने स्थित्वा भज सद्वर्म्ममादरात् । एवं कृते परत्रैव सर्व्वदापि फलं लभेः ॥
दुर्मतिं नैव वायास्त्वं सङ्गतिमेव यास्यसि । इत्यस्मद्वचनं श्रुत्वा हितार्हितं विचारय ॥
सात्वतो हि हितं कर्त्तुं सम्यग्धर्म्मं समाचर । इति तैस्तीर्थिकः प्रोक्तं वीतशोको निश्चय्य सः ॥
नैवं तद्वचनं सत्यमिति मत्वा मुमोद न । पुनस्ते तीर्थिकाः सर्व्वे एवं द्विधा त्रिधाऽपि तं ॥
वीतशोकं समाभाष्य परिबोध्य वज्रेऽनयन् ॥

as contrasted with the northern expansions and assimilations of the faith.”* The work itself professes to have been compiled by a disciple of the great teacher who converted Aśoka to the faith of Buddha, and in so far may claim to be all but contemporary authority. It is probably, however, of a much later origin; but one redaction of it was translated into the Chinese in the reign of the Western Tsin dynasty (circa 265-313),† and consequently the work must be admitted to be considerably older than the date of that version, and it leaves no room to doubt that at least one of the prevailing religions of the time of Aśoka was that of the Tīrthikas or of the Bráhmanic followers of the Vedas. It was those Tīrthis who felt most anxious about the perversion of Aśoka to the faith of Buddha, and not the Jains. They too put themselves most forward to check the evil; they everywhere denounced Buddhism as false; and kept numbers of the people attached to Hinduism. They again deterred the brother of Aśoka from becoming a Buddha, and set up the fratricidal war which terminated so disastrously against their protégé and his ancestral religion. And if Vítaśoka was a Hindu, it would be too much to say that his elder brother in his youth was a Jain, and that he had got it from his ancestors. The two uterine brothers could not but have been brought up in the same religion; and since Vítaśoka was a Hindu according to data admittedly “contributed by the very *nidus* of Buddhism,” the conclusion becomes all but inevitable that his brother likewise was one until he became a Bauddha.

The PRESIDENT said that he had not been able to read the whole of Mr. Thomas’s paper although that gentleman had kindly sent him a portion of the proof. He was therefore hardly competent to discuss the question raised by Dr. Rájendralála Mitra.

At the same time more and more materials were daily accumulating and it was perhaps premature to form any very positive theory as to the exact nature of Aśoka’s earlier faith. Even since Mr. Thomas’s article was sent to press translations had appeared in the ‘Indian Antiquary’ by Dr. Bühler of General Cunningham’s singular dated inscriptions ascribed to Aśoka, and if these were correctly ascribed, as it seemed scarcely possible to doubt they were, then a new light had been shed on Aśoka’s religious feelings, for in these inscriptions, recorded at the close of his long reign, he recorded that though he had held the true faith‡ for many years, he admitted that he had held it in a lukewarm fashion, and that it was only for the preceding twelve months that he had taken such measures as effectually to put a stop to the worship of the gods formerly held in reverence.

* Journal Roy. As. Soc. IX. p. 171.

† Beal’s Chinese Tripithaka, pp. 88, 89.

‡ That by this was meant Buddhism there can hardly now be any reasonable doubt.

Moreover Dr. Rájendralála's arguments turned a great deal on the interpretation of a particular passage in one of Ásoka's edicts. The President was glad to inform the Society that a complete collection of all the edicts of Ásoka, carefully revised by General Cunningham, with corrected translations, was just ready for publication; it might be wise to wait till that appeared before trusting too much to the presumed interpretation of a single passage.

Another part of Dr. Rájendralála Mitra's argument turned on the character of Jainism; but was it certain that the Jainism of to-day was the Jainism of Asoka's day, or in what respect that differed from Buddhism? The President might announce to the meeting that he had received from Dr. Bühler information that he had, in conjunction with Dr. Jacobi, discovered almost conclusive evidence that Buddha Sakya Muni or Gautama was actually contemporary with Mahavira, the latest Tirthankra of the Jains. This coincided with Colebrooke's conjecture, adopted by Cunningham, that Gautama was at one time a disciple of Mahavira's. The Jain books recorded the fact that Mahavira had a disciple named Gautama, but beyond that fact little was said of him, and this would quite coincide with the supposition of his having at a later date left the school of Mahavira and set up one of his own.

Mr. EDGAR called attention to the fact that in some of the Buddhist writings the name of "Mahavira" was given to Buddha also.

The PRESIDENT replied that he was aware of the fact but had not mentioned it, as it bore rather on another phase of the question. Raja Sivaprasad had based on this undoubted fact the very probable conclusion that "Mahavira" was a mere honorific title, and indeed had gone further and had endeavoured to identify the Mahavira of the Jains with the Kasyapa of the Buddhist legends, but so far this was little but conjecture, if indeed it was quite consistent with the legends of Buddhism.

Captain WATERHOUSE read translations of extracts from letters from M. Ch. Ujfalvy and the Abbé Desgodins, descriptive of recent geographical researches in Turkistan and Thibet—published in the October number of the *Bulletin de la Société de Géographie*.

The following interesting account of Farghana (or Khokand)* is given by M. Ch. de Ujfalvy in a letter to the General Secretary of the French Geographical Society, dated Tús, 19th August 1877.

"Having left Tashkend six weeks ago, I proceeded first to Khokand with post-horses. After leaving Khokand, I made a tour on horseback, in order to see more closely the character of the country and to be able to

* The spelling of the names has been given as in Col. Walker's map of Turkestan. (J. W.)

study its inhabitants and monuments quite at my ease. In this manner I travelled 655 kilometres, passing through Marghilán, Wadil, Sháh-i-Mardán (lake Kútbán Kúl), Uch-Kúrgán, Naukat, Osh, Andiján, Naman-gán, Kassán and Tús (called by the Russians Tchúst).

“As regards ethnology, I have succeeded in measuring more than 200 individuals; and have studied the manners, customs, creeds and languages of the different races inhabiting Farghanah. I have collected specimens of the flora and fauna of the country, with fragments of its minerals, and have made enquiries as to the productive powers of the soil and the products of national industry. I have purchased all objects which appeared to me to give a fairly correct idea of this industry. Finally I have made a collection of Greek, Bactrian, Arab and other coins, and have studied the archæological remains of the country. A few details of the results of these studies will acquaint you at once with my researches.

“Farghána is with the district of Zaráfshán the only fertile tract in Russian Central Asia which appears to have a future more or less close at hand from the point of view of the political economist. The country appears to be an oblong valley, of elliptical form, shut in on nearly all sides. The nucleus of this valley is surrounded with a triple ring of mountains of a diverse character. The centre also shows three zones entirely unlike one another.

“Let us run rapidly through these six zones, starting from the centre, that is to say from the banks of the Sir Daria.

“The first zone, about the banks of the Sir Daria, the Narin and the Kara Daria, is nearly everywhere sandy, rarely grassy; here and there, an oasis of verdure appears, the ephemeral existence of which is often dependent on storms and moving sands. A few Usbegs and some poor Kara-Kalpaks nomadise about these inhospitable tracts.

“The second zone, fortunately more extensive than the first, is the most fertile in the country. It is a succession of gardens, fields of wheat, maize, jugara, cotton, vineyards and meadows. In the same way as oases are rare in the first zone, parts covered with sands or moorland are unfrequent in the second. It is the garden of Farghana, and the tract situated between Andiján and Namangán, called Eki-su-arasi, is particularly distinguished by its incomparable fertility. In this zone the great commercial centres of the country are to be found, such as Khokand (as a Sart town much above Tashkend in every way), Marghilán (the new Russian capital), Osh, Andiján and Namangán. The most numerous inhabitants of this tract are the Sarts (a mixture of Tajiks, Usbegs and occasionally of Kirghiz), the Usbegs and the Kipchaks, Tajiks, Túrúks, Kashgarians, Kara Kalpaks, Jews, Louli gypsies, Mazang gypsies, Kara Kirghiz, Hindustanis and Afghans are also to be found there.

“The third zone, of less extent than the preceding, is generally stony and sometimes covered with moorland and even with sand. Here and there attempts have been made to reclaim by cultivation some of the land from its primitive barrenness, and these attempts have succeeded fairly well, seeing that the soil is everywhere fit for ploughing. Usbegs and Kipchaks are the few inhabitants of this tract.

“The fourth zone, situated on the most fertile slopes of the mountains, is, to my mind, the most beautiful part of Farghana, enjoying all the advantages of a warm climate, while scarcely suffering any of its inconveniences.

“It is the tract that would be most suited for an European colony. It is inhabited almost exclusively by Tajiks who have often entirely preserved the purity of their race. Usbegs and Kipchaks are to be found in small numbers and the Karakirghiz occasionally settle down there. Isfara, Wadil, Uch-Kurghán, and Naukat to the south; Kasán and Tús to the north are its principal agricultural and commercial centres.

“The fifth zone, that of the valleys, mountains, hill slopes and plateaux, often presents a somewhat barren appearance, especially when the burning sun of these parts has burnt up the vegetation, but vast grassy steppes are also frequently to be found, which offer excellent sustenance to the flocks of the Karakirghiz, and neighbouring races of Usbegs and Tajiks. It is the home of the Karakirghiz who move about there in all liberty.

“The sixth zone, finally, is the most elevated and the most picturesque, but at the same time the most desolate. In this zone are situated the numerous routes, passes and defiles which lead into Semiretché, Kashgaria, Karatigin, and the government of the Syr-Daria. It is, however, specially interesting from a commercial and strategical point of view. Lapis-lazuli amethyst, rock-crystal, naptha, salt, coal and mineral springs are to be found there. When at some early future time, all the resources of the country are laid under contribution, this region will equally be called upon to render notable services to the national industry.

“I have already given the Anthropological Society numerous details regarding the inhabitants of Farghana, and I reserve bringing this question before the Geographical Society until I shall be able to present to them the little ethnographical map of these regions I am now compiling.

“As regards archæology there is little to be said considering the extent of the country. I have, however, succeeded in finding some places which appeared rather interesting. I excavated a Kurgán (tumulus) in the environs of Marghilán, but unsuccessfully, only finding some fragments of pottery, glass beads, &c., and bones of no value whatever.

“The Takht-i-Sulimán at Osh is more interesting for its picturesqueness than for its archæology, and the numerous mosques and madrasahs of

Khokand and Osh, generally of a rather agreeable construction, are all more or less modern. At Namangán, however, there are two old mosques called Hojamné Kabri and Aziz Halfa, the first of which is an architectural *chef-d'œuvre*. I have brought back some of the inscriptions I was able to copy. Near Kasán, the oldest town in Farghana, is a cemetery called Sad-pir, which contains nearly 70 tombs, all with inscriptions. This cemetery dates from upwards of 600 years ago, when the Calmucks invaded and pillaged the country and slaughtered its richest and most notable inhabitants. I have taken impressions of more than 20 inscriptions, and shall take back three stones to Tashkend. The Tajiks of Kasán say that they came into the country before the introduction of Islam. At 16 kilometres from Kasán there is another rather curious tomb, called Safed Boulán. Unfortunately there are no inscriptions about it. Finally, near Tús, not far from the little village of Háuva, is another cemetery named Mazar; there are in it five stones with inscriptions. I have taken impressions of three of these stones which appeared to me the finest, and which the mullahs of the place could not decipher. I go back to Tashkend and hope to return to Europe by Siberia."

Extract from a letter by the Abbé Desgodins to his brother, dated 28th March 1877, containing Notes on Thibet.

"The following is some new information which should confirm the identity of the Yar-Kiu-tsang-po river of Thibet with the Brahmaputra. An old Llama related to me yesterday that in his youth he had travelled a great deal and had visited nearly the whole of Thibet. He had followed the great river from its source in or near the lakes of Tso-ma-pang (Manasarowar), which are situated in the western part of the province of Ngaré, the most western province of Thibet, and while making his pilgrimages of devotion, he had arrived as far as the frontiers of the savage tribe of Lhopas. He said that at a distance of some days' march from Lhassa, the river turns towards the south and making a long bend passes through the Tibetan district of Hia-yul governed by the Kalun Doring of Lhassa, a very populous and rich district which is situated just to the north of the Lhopas. The river enters the country occupied by this wild tribe and passes through perpendicular rocks, precipitous and bare, without paths, and over which the only passage is by means of bad ladders made of the stems of climbing plants. After a certain course through the Lhopas country, the river falls perpendicularly from the top of a rock into a valley the name of which he did not know. The height of the fall is so great that it makes one giddy. At this spot, he said, the stream is almost as considerable as the Kin-cha-Kiang at Bat-hang and the Lan-tsang-kiang at the Salt Lakes. The details he gave me regarding these Lhopas removes all doubt. They are the same as those

spoken of by the slave, now a Christian, of whom I spoke in a former paper and called Abors by the English and M. Krick. All this information perfectly confirms the information I gave in my letter of the 14th June 1874, but here is something further in favour of it.

“Every one in Assam knows the fall of Brahmakund, whither the heathen resort as pilgrims. M. Bernard has often spoken to me of it as a fall remarkable for its height, the force of its volume of water, and the hollow it scoops out in falling. The southerly position attributed by my *confrère* to this vast fall, and the northerly position given to it yesterday by the Llama, induce me to believe that the fall at Brahmakund must be precisely the fall of the Yar-Kiu-tsang-po which then becomes the Brahmaputra, the latter being navigable almost immediately after this addition.

“My interlocutor assured me over and over again that the Yar-kiu-tsang-po did not reach so far as the Nahong (Mishmi) country, but that it disappeared more to the west among the Lhopas (Abors).*

“I give this information just as I received it, but I must confess I consider it very probable because it perfectly confirms the information I had previously received.

“This good Llama has also given me other geographical information. I shall only now mention those points which appear to me certain and confirmatory of the information I had already received and checked some time ago.

“In going from Cha-mu-to on the Lan-tsang-kiang, to Lhasa by the official highway, after having passed the Lon-tse-kiang, the principal posts of Lo-rong-dzong, Chu-pan-to (Tibetan, Chúpádo) Lali (Tibetan, Larego) and Kiam da (Tibetan, Kong-bon-Kiam-da) are reached. To the south of Chou-pan-to and Lali, at about two days march, the independent principality of Po-yul (Chinese Pomi) is passed on the left hand (looking south). This principality recognises the emperor of China and is governed directly by the third ambassador of Lhasa who bears the title of I-tsin. It does not recognise in any way the Tibetan king of Lhasa. It is divided between four native chiefs, who are almost quite independent in their respective territories and only consult together on the affairs common to the tribe. One of them calls himself Don-ya-peun, or chief of Don-ya to the south-east. I do not know the names of the rest. This country is said to be fairly rich, of difficult access, surrounded as it is on all sides by high pre-

* From a conversation with the ‘Pandit,’ Nain Singh, I learnt that the name of Lhopa is given by the Tibetans to the Daphla tribes. This fact taken in connection with the Llama’s account seems to favour Lieut.-Col. Godwin-Austen’s belief, founded on observations made during the Daphla Campaign, that the Subansiri is the continuation of the Sanpú. As shown on the map, however, these tribes are a good deal to the west of the Subansiri. (J. W.)

citious mountains. The red lamas are very numerous there, robbers still more so, and they often make expeditions beyond their own boundaries. Leprosy is said to be very common. Po-yul has as a neighbour on the west the Tibetan tribe known under the name of Kong-ba, of which Kiam-da is the principal town or city. This country stretches almost as far as Lhasa, it is said to be very populous and fairly rich, but the inhabitants are very much stricken with leprosy. Another rather singular peculiarity of this country is that the proportion of girls is very much larger than that of boys in the statistics of births.

“The country of Po-yul (Po-mi) does not touch, to the south, the chain of the Himalayas and the country of the wild tribes, from which it is separated by a band of country governed by Lhasa.

“The names of the different Tibetan districts of this zone going from east to west are as follows. Hia-yul, to the north of the Lhopas (Abors), Tse-tang, Sang-ye, Meun-pa, these, I believe, are situated to the north of Sikkim and Bhután, but for these last names I must get further information. I only mention them with all reserve.

“The eastern limit of Po-yul is the western slope of the chain of mountains which comes down from north to south on the right bank of the Lutse-kiang. When I passed along to Pomda and Zo-gong on the Du-kio, in 1862, every one pointed out to me the west, beyond the chain I have just mentioned, as being the true position of Poyul.”

MAJOR-GENERAL THUILLIER said:—The extracts we have just heard read from the French Geographical Society's Journal were of particular interest at the present moment, as to the identity of the great Thibetan river Sanpú, or Yaru, and its connection with the Brahmaputra in Upper Assam, because that still pending problem was receiving great attention by the officers of the Great Trigonometrical and Topographical Surveys, Lieuts. Harman and Woodthorpe, R. E., who were just now exploring the course of the Subansiri river in north Lakhimpur, and endeavouring to push up beyond the course as laid down by Major Godwin-Austen, when employed with the Daphla military expedition in 1874-5, to see if there was any possibility of the Sanpu breaking through the high range of mountains in that direction and so falling, through the Subansiri, into the Brahmaputra about the meridian of 94° E. Longitude, or near Lakhimpur in Assam. It may be remembered that the Trigonometrical Survey native explorer “Nain Sing” came down from Lhasa, through Bután due south, and entered Assam at a place called Udalguri almost on the meridian of Gauhati. He traced the Sanpú, and it is recorded in the latest map of Assam published at the Surveyor General's Office, down to the parallel of about 29° Latitude, which, it will be observed from the map on the table, is in close proximity to the supposed continuation of the course of the Subansiri, as seen by Godwin-Austen from the highest elevation from which he observed in the Daphla country.

The volume of water down the Subansiri is said to favour the idea of its junction with the Sanpú, and further careful observations are now being made by Lieuts. Harman and Woodthorpe, R. E., to ascertain whether the Subansiri exceeds the capacity of the Dihong or of the Dibong, the former of which has long been held by English geographers to be the real outlet for the Sanpú into the Brahmaputra, near Sadiya.

It was unfortunate that the journey taken by the explorer Nain Sing, below or south of Lhasa, was too far west to solve this interesting and long pending doubt, but the statement made by the author of the paper now read, certainly favoured the assumption regarding the probability of the Subansiri theory. The question, however, was altogether conjectural at present, and must remain so until more conclusive evidence is produced as to the real course of the Dibong as well as of the Subansiri upwards, or other native explorers can penetrate downwards from Lhasa to the head of the Assam valley through the Abor and Miri tribes inhabiting that remarkably unknown and untrodden region.

If at the time of the Daphla Military expedition Major Godwin-Austen and Lieut. Harman, then employed on the Survey, had been permitted to extend their explorations after the political and military objects of the expedition had been gained, and as so strongly urged by the late Commander-in-Chief, Lord Napier of Magdala, it is possible that a large extent of country in the direction of the northern branch of the Subansiri, as well as east of it, in the neighbourhood of the Abors and Miris, towards the Dibong, might have been laid down, but all that tract north-east of Lakhimpur still remains to be reconnoitred and it is hoped that by the strenuous exertions of the talented engineer officers now engaged in prosecuting the work as far as permitted by the Government of India, something may soon be achieved towards the satisfactory elucidation of this interesting and important geographical problem—and also towards a better knowledge of all the extreme N. E. Frontier round Sadiya and the head of the Brahmaputra, beyond or north of Brahmakund, so necessary for a due and proper construction of the map of the Assam Province and of British Indian limits in that direction.

The following paper was read—

1. *Pali Studies, No. 2, Vuttodaya.* By MAJOR G. S. FRYER, Deputy Commissioner, British Burma.

The SECRETARY read the introduction to this paper which will be published in full in Part I of the Journal.

LIBRARY.

The following additions have been made to the Library since the Meeting held in December last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,
presented by the respective Societies or Editors.

Berlin. Die Königliche Preussische Akademie der Wissenschaften,—Monatsbericht, August 1877.

Grube.—Anneliden-Ausbeute, S. M. S. Gazelle. *Peters*.—Neue merkwürdige Art von fliegenden Fischen, *Exocoetus cirriger*, aus China und einen neuen Muraeniden, *Ophichthys bitaeniatus*, aus Mombas.

Birmingham. Institution of Mechanical Engineers,—Proceedings, July, 1877.

J. C. Wilson.—On the construction of Safety Valves. *F. W. Webb*.—On an improved form of Slide-Valve for Steam and Hydraulic Engines. *W. Froude*.—On a New Dynamometer for measuring the Power delivered to the Screws of large Ships.

Bombay. The Indian Antiquary,—Vol. 6, Parts 74, 75, December 1877, and January 1878.

J. W. McCrindle, Esq.—The Indika of Megasthenês. *Professor A. Weber*,—On the Krishnajanmâshtamî, or Krishna's Birth-Festival, translated from the German by Miss Tweedie.

———. The Vedârthayatna,—Vol. II, Pts. 5 and 6.

Boston. Society of Natural History,—Proceedings, Vol. 18, Pts. 3, 4, 1876.

Pt. 3. *G. W. Bond*.—Origin of the Domestic Sheep.

Pt. 4. *W. K. Brooks*.—Affinities of the Mollusca and Molluscoida. *Prof. W. H. Niles*.—Geological Agency of Lateral Pressure exhibited by certain Rock Movements. *S. H. Scudder*.—Notes on the *Forficulariæ*, with a List of the Described Species.

———. ———. Memoirs,—Vol. 2, Pt. 4, No. 5.

A. Hyatt.—Revision of the N. American *Poriferae*; with remarks upon foreign species.

Calcutta. Geological Survey of India,—Records, Vol. 10, Pt. 4, 1877.

V. Ball. On the Geology of the Mahanadi Basin and its Vicinity. *Dr. Feistmantel*. Note on Fossil Flora in India.

———. Mahâbhârata,—No. 16.

———. Râmâyana,—Vol. 6, No. 4.

———. Rigveda Sanhita,—Vol. 1, Pt. 4.

———. Sârvartha Dayini,—Part 1, chap. 2.

Dublin. Dublin University Biological Association,—Proceedings, Vol. 1, No. 3, 1875-6.

Greenwood Pim.—The Leaf structure of *Begonia*.

Frankfort. Die Senckenbergische naturforschende Gesellschaft,—Berichte, 1874-75, 1875-76.

———. ———. Abhandlungen, Band 10, Heft. 1—4; Band 11, Heft 1.

Band 10, Heft. 3, 4. *O. Bütschli.*—Studien über die ersten Entwicklungsvorgänge der Eizelle, die Zelltheilung und die Conjugation der Infusorien.

Band 11, Heft 1. *O. Böttger.*—Die Reptilien und Amphibien von Madagascar.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.
FOR FEBRUARY, 1878.

The Annual Meeting of the Asiatic Society was held on Wednesday, the 6th February, 1878, at 9 o'clock P. M.

The Hon'ble Sir E. C. BAYLEY, K. C. S. I., C. I. E., President, in the Chair.

According to the Bye-laws of the Society, the President ordered the voting papers to be distributed for the election of Officers and Members of Council for 1878, and appointed Messrs. R. B. Shaw and H. H. Locke, Scrutineers.

The President then called upon the Secretary to read the Annual Report.

ANNUAL REPORT FOR 1877.

The Council of the Asiatic Society, in submitting their usual Annual Report exhibiting the state of the Society's affairs during the year 1877, are glad to be able to state that the position of the Society is on the whole satisfactory, both as regards the state of its finances and the extent and variety of its publications.

During the year 1877 there has been an accession to the Society of 26 ordinary Members, while the losses by death (5), retirement (17), and removal (6) amount to 28. The number of ordinary Members at the close of the year was therefore 345, against 347 in 1876. Of the ordinary Members on the roll, 46 are absent from India, leaving 113 Resident, 163 non-Resident, 14 Foreign, and 9 Life Members, on the effective list.

The annexed Tabular Statement shews the fluctuations in the number of the ordinary Members during the last five years.

Year.	Paying.				Life.	Absent.	Total.
		Resident.	Non-Resident.	Foreign.		Non-paying.	
1873, ...	305	116	186	...	3	53	358
1874, ...	312	127	184	...	3	32	346
1875, ...	295	113	179	...	3	50	345
1876, ...	299	119	175	...	5	48	347
1877, ...	290	113	163	14	9	46	345

During the year 4 members have compounded for their subscriptions, and the compounding fees and entrance fees, amounting altogether to Rs. 1,650, have been duly funded in the Permanent Reserve Fund.

Dr. John Muir was elected an Honorary Member of the Society.

Of the deceased members whose loss the Society has to regret, the Hon'ble Maharájáh Ramanath Tagore, C. S. I., had been a Member of the Society for 40 years, during which period he served twice on the Council. His patriotic and enlightened efforts for the improvement of his countrymen will be long remembered.

Mr. J. Geoghegan had been 18 years a member of the Society, and had served 3 years on the Council, as well as having been a member of various Committees; the Council have to deplore that a career which gave so much promise of great usefulness, has been cut short so prematurely.

The other names in the Obituary are Colonel D. G. Robinson, R. E. Kumar Giris Chandra Siñha, and Babu Vrindavanachandra Mandala of Balasor.

Mr. Robert Swinhoe, F. R. S., the author of many valuable contributions relating to the mammals and birds of China, who died on the 20th October, had been a Corresponding Member of the Society since 1860.

Indian Museum.

During the past year the Council have received no presentations requiring to be transferred to the Indian Museum under the provisions of Act XXII of 1876.

In accordance with the provision of the above Act which, allots an additional Trustee to represent the interests of the Society, the Council appointed Mr. T. S. Isaac a Trustee on behalf of the Society.

The Hon'ble Sir E. C. Bayley, K. C., S. I. (*President*), Dr. T. R. Lewis, Captain J. Waterhouse and Mr. H. Blochmann have continued to act as Trustees on behalf of the Society throughout the year.

Finance.

The Council have to observe that though the actual financial condition of the Society is perfectly sound and prosperous, the income of the past year shows a falling off owing to the reduction of subscriptions, and was less than the expenditure, by Rs. 854-15-11.

The circumstances of the year were rather exceptional, but the Council believe that with care the reduced income will be found sufficient to meet the ordinary expenses of the Society, and their anxious attention will be given to this object during the current year.

It is somewhat difficult, however, to ascertain the exact financial position of the Society at present, because during the past year a great deal of extraordinary expense was incurred on account of Repairs to the Building and Furniture, &c., and it is not always easy to estimate the amounts to be charged against ordinary or extraordinary expenditure.

After all liabilities on account of the repairs &c. had been met, there remained Government Securities amounting to Rs. 1,36,000. Of this sum Rs. 1,26,700 have been transferred to the Permanent Reserve Fund, under Rule 67, and will yield an income of Rs. 6,836-8 annually till the expiry of the 5½ per cent. loan.

The balance, amounting to Rs. 9,300, has been kept in the Temporary Reserve Fund, and is available to meet any extraordinary expenses beyond the limits of the regular annual income, though care must be taken in regulating such expenditure out of the capital of the Society. The interest accruing from this part of the Society's vested Funds will amount to Rs. 511 annually, and, allowing for the probable sale of Rs. 2000 during the year, on account of the publication of Mr. Moore's papers and the preparation and publication of the new Library Catalogue, the total income derivable from these funds for the year may be set down at Rs. 7,200, or Rs. 600 a month.

The gross receipts of the Society during the year amount, as shewn in the table below, to Rs. 41,346-11-1 and the gross expenditure to Rs. 38,651-13-10.

This latter sum includes the following items of extraordinary expenditure : under *Publications*, Rs. 571-8-10, remitted to England in advance for the publication of Mr. Moore's papers on Indian Lepidoptera ; under *Library*, Rs. 935-3-1, for the new Catalogues and MSS ; under "*Refund of Loan*," Rs. 2,000 repaid to the O. P. and Conservation of Sanskrit MSS. Funds ; under *Furniture and Building*, Rs. 15,695-12-0. The total of these items amounts to Rs. 19,202-5-11, which was partly met by the sale of Government Securities for Rs. 17,000.

The income of the Society shows a falling off during the past year, chiefly in the receipts from subscriptions, which amount to Rs. 7,200

against Rs. 9,009 for the previous year ; this, however, was to be expected in consequence of the reduction of the quarterly subscriptions of resident members from Rs. 12 to 9 : the actual loss on this head amounts to Rs. 1,272.

The receipts from admission and compounding fees were Rs. 880 and Rs. 770 respectively, but as these sums are funded they cannot be considered part of the *income* of the Society, and have consequently been omitted from the table showing the net income of the Society. These items were included in the estimate of 'income' for 1877.

The outstandings due to the Society for admission-fees, subscriptions, and sale of publications have, the Council regret to report, increased during the year from Rs. 6,270 to Rs. 7,074-5-5, the greater portion of which is irrecoverable, and will have to be written off to profit and loss. The arrears for subscriptions from Members only, are Rs. 5,874-14, upon which a reduction of Rs. 400 has been effected during the year.

The following is a Statement of the Cash Assets of the Society at the close of 1877.

Permanent Vested Fund,	...	...	Rs. 1,26,700	0	0
Temporary do.,	...	...	...	9,300	0 0
Balance in Bank of Bengal,	...	...	...	2,968	2 1
Cash in hand,	...	...	...	156	14 7
			<hr/>		
			Total Rs. ...	1,39,125	0 8
			<hr/>		

The following tables will show the Gross Receipts and Expenditure of the Society as compared with the previous year, and also the Net Income and Ordinary Expenditure.

GROSS RECEIPTS.

			1876.			1877.		
Balance of 1875,	...	Rs.	3,206	6	5	3,432	3	5
Admission Fees,	...	...	800	0	0	880	0	0
Subscriptions, ...	...	...	9,009	1	9	7,200	2	0
Publications, ...	...	...	1,535	8	0	1,633	5	0
Library, ...	...	...	312	9	6	227	5	0
Fines, &c., ...	...	...	60	8	3	47	7	9
Received from Government,...	...	...	1,50,000	0	0	0	0	0
Sale of Government Securities,	...	...	5,102	14	8	17,501	0	11
Interest on do.,...	...	...	8,573	0	0	7,583	0	0
Rent from Government, ...	...	...	1,920	0	0	0	0	0
			<hr/>			<hr/>		
Carried over, Rs.			1,80,520	0	7	38,504	8	1

			1876.			1877.		
	Brought over, Rs.	1,80,520	0	7	38,504	8	1	
Coin Fund, ...	...	...	0	0	17	0	0
Loan from Fund <i>a/c</i>	...	...	1,040	7	1,000	0	0
Do. O. P. Fund,	...	...	1,086	5	0	0	0
Do. Cons. MSS.	...	...	1,000	0	0	0	0
Refund of postage,	...	...	995	5	1,033	11	0
Compounding Fees,	...	...	0	0	770	0	0
Contingent charges,	...	...	0	0	21	8	0
			<hr/>					
	Total Rs. ...	1,84,642	3	7	41,346	11	1	

GROSS EXPENDITURE.

		1876.			1877.		
Publications, ...	Rs.	8,893	14	6	8,194	15	5
Library (Purchase of Books, &c.,)	...	1,225	7	7	3,436	13	9
Do. Extra men for Catalogues,	...	0	0	0	935	3	0
Establishment, Library, ...	...	1,936	0	0	1,800	0	0
Do. Secretary's office,	...	2,055	8	0	2,191	0	0
Secretary's office, contingencies,	...	1,020	0	0	1,452	15	8
Purchase of Government Securities,	...	1,50,940	10	2	0	0	0
Sale of Government Securities,	...	0	0	0	78	8	1
Interest of ditto, ...	...	21	6	8	18	15	2
Coin Fund, ...	...	81	13	0	221	10	0
Furniture, &c., ...	...	2,361	14	0	8,125	15	6
Building, ...	...	9,177	10	0	7,569	13	6
Taxes, ...	...	861	13	6	750	0	0
Loan from Fund <i>a/c</i> ...	...	1,130	0	0	800	0	0
Ditto from O. P. Fund <i>a/c</i> ...	...	86	5	9	1,000	0	0
Cons. of Sans. MSS. <i>a/c</i> ...	...	0	0	0	1,000	0	0
Refund of postage, ...	...	1,417	9	0	1,075	15	9
	Rs.	1,81,210	0	2	38,651	13	10
Balance	...	3,432	3	5	2,694	13	3
	Rs.	1,84,642	3	7	41,346	11	1

NET INCOME.									
			1876.			1877.			
Subscriptions,	...	...	Rs.	9,009	1 9	Rs.	7,200	2 0	
Publications,	...	...	...	1,535	8 0	...	1,633	5 0	
Library, ...	...	...	...	312	9 6	...	227	5 0	
Fines, &c.,	...	...	...	60	8 3	...	47	7 9	
Rent from Government,	...	...	...	1,920	0 0	...	0	0 0	
Interest,	...	...	...	8,573	0 0	...	7,583	0 0	
Coin Fund,	...	...	...	0	0 0	...	17	0 0	
Refund of postage,	...	...	...	995	5 9	...	1,033	11 0	
Contingent charges,	...	...	...	0	0 0	...	21	8 0	
			Rs. 22,406 1 3			17,763 6 9			

ORDINARY EXPENDITURE.									
Publications,	...	...	Rs.	8,893	14 6	Rs.	7,623	8 7	
Library,	...	...	...	1,225	7 7	...	3,436	13 3	
Establishment, Library,	...	...	...	1,936	0 0	...	1,800	0 0	
Do. Secretary's office,	...	...	...	2,055	8 0	...	2,191	0 0	
Interest,	...	...	...	21	6 8	...	18	15 2	
Contingent charges,	...	...	...	1,020	0 0	...	1,452	15 8	
Coin Fund,	...	...	...	81	13 0	...	221	10 0	
Taxes,	...	...	...	861	13 6	...	750	0 0	
Refund of postage,	...	...	...	917	9 0	...	1,075	15 9	
			Rs. ... 17,013 8 3			18,570 14 5			

The following is the Estimate for Income and Expenditure for 1878.

INCOME.									
Balance in hand,	...	...	...	Rs.	2,694	0 0			
Subscriptions,	...	...	...	...	7,200	0 0			
Publications }	...	...	...	...	1,800	0 0			
Library, }	...	...	...	...	7,250	0 0			
Interest from Vested Funds,	...	...	...	...	
			Rs. 18,944			0 0			

EXPENDITURE.

Publications, ...	...	...	Rs.	7,400	0	0
Establishment, Library, ...	...	...	...	1,800	0	0
Do. Secretary's office, ...	...	...	...	2,200	0	0
Contingencies and petty charges, ...	...	...	...	2,294	0	0
Building, ...	...	...	...	500	0	0
Furniture, ...	...	...	...	500	0	0
Coin Fund, ...	...	...	...	500	0	0
Library, ...	...	...	...	3,000	0	0
Taxes, ...	...	...	...	750	0	0
				Rs.	18,944	0 0

The cost of the publication of Part I of Mr. Moore's papers on Mr. Atkinson's *Lepidoptera* and of the new Library Catalogues will have to be met from vested funds.

The London Agency.

Messrs. Trübner and Co.'s half yearly statement of accounts with the Society (1st July 1876 to 1st January 1877) shewed a balance of £118-2-10½ *d.* due from the Society, which on subsequent examination was reduced to £108-16 and duly remitted to Messrs. Trübner and Co.

According to Messrs. Trübner and Co.'s statement, the sale of the Society's publications from 1st July 1876 to 1st January 1877, amounted to Rs. 246 and that of the Bibliotheca Indica publications to Rs. 78-12-0. This sum, representing £26-8, was placed to the credit of the Society and O. P. Fund respectively.

Ten Invoices, consisting of publications of scientific Societies, presented to and subscribed for by the Society, books purchased and books on inspection, were received from Messrs. Trübner and Co. during 1877. The money value of these consignments amounted to £167-18-9, from which the sum of £8-11 has to be deducted for the value of books returned, leaving a balance of £159-7-9. 156 copies of both parts of the Journal, and 192 copies of the Proceedings were despatched to Messrs. Trübner and Co. for sale; representing respectively a money value of £28-12 and £10-8. Of the Bibliotheca Indica publications 864 copies, valued at Rs. 771-0 were sent for sale.

Library.

The additions to the Library during the year comprise in all 1,235 vols. and parts of vols. Of these 658 were received as presentations from Government, from Authors and by exchange, and 577 were added by purchase, which is considerably in excess of the additions made in the same way to the Library in past years.

As it was found that the Catalogue of the Library prepared by the

late Assistant Secretary was very imperfect, steps were taken to prepare an entirely new one, and for this purpose the Council sanctioned the employment of Mr. S. D'Cruze, who, with the Assistant Secretary, under Mr. Blochmann's close supervision, has made great progress in cataloguing and arranging the Library, and it is hoped that the new Catalogue may be ready for publication during the current year, and this long-felt want supplied.

Reference was made in the last report to the progress made in preparing an analytical Catalogue of the Sanskrit MSS. in the Society's Library. Owing to the repairs of the house, much interruption was caused to this work during the past year, and the Pundit employed on it could examine and catalogue only 200 MSS. The Pundit has also compiled Indices of works in the following branches of Sanskrit Literature, to be appended to Catalogues hereafter to be published:—Kosha, Kāvya, Ch'hando, Alankāra, Jyotisha, Vaidyaka. In the meanwhile Dr. R. Mitra carried through the Press the first part of the work, comprising detailed notices of all the works on Sanskrit Grammar available in the Library. Annexed to this volume is a list of all works on the subject known to exist.

The Council are glad to announce that considerable progress has also been made in the printing of Dr. Mitra's analysis of the valuable collection of Sanskrit Buddhist MSS. presented to the Society by Mr. B. H. Hodgson.

The Books and Book-cases in the Library have been properly arranged and numbered.

The Photographic collection has received the following additions, both presented by the Home Department of the Government of India.

1. A set of Photographs of the paintings at the Ajanta Caves.
2. A set of Photographs of the Kantanagar Temple in Dinájpur.

Publications.

The Publications of the Society issued during the year compare favourably with those of former years, and comprise 10 numbers of the Proceedings consisting of 274 pages of text, with 3 plates. The Meteorological Observations, hitherto issued from the Surveyor General's Office, have been discontinued from March, and do not therefore appear in the Proceedings from that month.

Four numbers of the Journal, Part I, have been issued, containing 468 pages of text, illustrated by 13 Plates. Of Journal Part II, 3 numbers have also been issued, consisting of 314 pages of text illustrated by 1 plate. The fourth number is in preparation and will be issued soon.

The Council have made arrangements for publishing the descriptions by Messrs. Moore and Hewitson of the new species of Indian *Lepidoptera* in the collections of the late Mr. W. S. Atkinson. They will be in three parts, quarto form, similar to the transactions of the Zoological Society

and will be illustrated by 9 plates. Orders have been given for printing 525 copies, of which 200 will have coloured plates. It is proposed to give each member of the Society a copy of the work with plain plates, but those members who wish to have copies with the plates coloured will be able to obtain them by paying the additional cost of colouring, estimated at about Rs. 10 per copy.

Building.

The amount spent up to 31st December 1876 on account of "Repairs and Alterations" and for "Furniture and Fittings," was Rs. 11,561-14. During 1877, a further sum of Rs. 7,569-13-6 was paid to Messrs. Mackintosh, Burn and Co. in full of their bill for repairs and alterations, and Rs. 8,125-15-6 was expended in purchasing furniture for the Society's public rooms, book-cases for the Library, and for restoring the pictures and picture frames of the Society's collection of paintings. The total amount, therefore, spent during 1876-77 in the improvement of the Society's property amounts to Rs. 27,257-11. It is anticipated that no further outlay on these heads will be required for some time to come.

With reference to the new railing it was intended to erect along the Park Street front of the premises, the Council have to report that nothing has as yet been decided upon. During the year negotiations were opened with the Municipality, who were desirous of obtaining a portion of the Society's ground to improve the approach to Park Street, in return for which they were to share the expense of erecting a handsome railing. The negotiations, however, fell through. A statement of the case was submitted to the Society by the Council, at the December meeting.

Coin Cabinet.

To the Coin Cabinet of the Society have been added during the year, 7 gold coins, acquired by purchase, and 12 copper coins presented to the Society by Babu Jogesh Chunder Dutt.

Secretary's Office.

Mr. Blochmann, the Philological Secretary, has throughout the year retained charge of Part I of the Journal. Mr. Wood-Mason retained the Natural History Secretaryship till July, when he proceeded to England. For the remainder of the year Mr. W. T. Blanford and Captain Waterhouse have superintended the publication of Part II of the Journal.

The duties of the General Secretaryship and editing of the Proceedings were performed by Capt. Waterhouse, except for the month of January when Mr. Blochmann took temporary charge. Mr. H. B. Medlicott has retained charge of the Treasurership throughout the year.

The Asst. Secretary, Mr. Leonard, has continued to give satisfaction by the diligent and zealous discharge of his duties. The Asst. Librarian, Maulawí Ghulám Akbar, was dismissed for incompetence and Mr. Andrews was engaged in his place. Mr. Andrews has given satisfaction. Bábus Kedarnath Bysack, Cashier, Ramjibun Mookerjea, Asst.-Cashier, and Jadu Bindo Bysack, Storekeeper, have continued to perform their duties diligently.

Bibliotheca Indica.

A. Arabic and Persian Series.

In the Arabic and Persian Series, eleven fasciculi were issued during the year, *viz.*, 2 Arabic, and 9 Persian.

Of the *IçÁBAH*, or 'Biographical Dictionary of Muhammad,' by Ibn Hajar 'Askalaní, Maulawí 'Abdul-Hai, Head-Professor of the Calcutta Madrasah, has issued two fasciculi.

Mr. Blochmann has issued three quarto fasciculi of the Persian text of the *AÍN-I-AKBARÍ*. The work, which was commenced in 1868, is now complete. It consists of two volumes of nearly 1100 quarto pages, two geographical indexes, an index of Hindí scientific terms, a biography of Abul-Fazl, and a Preface containing the necessary information regarding the 15 MSS. from which Mr. Blochmann collated the text, and the style and the writings of the author. The Government of India, with its usual liberality, had made a special grant of Rs. 5000 towards the cost of printing.

Maulawí 'Abdur-Rahím, of the Calcutta Madrasah, issued during 1877 six fasciculi of Abul-Fazl's *AKBARNÁMAH*. The text of the first volume of this work, which contains the history of Akbar's predecessors, is now finished. Of the second volume, two more fasciculi have been printed, which bring the history of Akbar's reign to 970 (A. D. 1563). An index to Vol. I, of names of persons and of geographical places, is in course of preparation, and will be issued during the present year.

B. Sanskrit Series.

In the Sanskrit series altogether twenty fasciculi were issued during the past year. With a view to complete without delay some of the larger works on hand, no new work was undertaken. Of the largest work on hand, the *Sáma Veda Sañhitá*, six fasciculi have been published, completing the fourth volume. Another volume, it is expected, will bring this elaborate and important work to a close. This work, supplemented by the *Bráhmaṇas*, so critically edited by Dr. Burnell of Madras, will place the whole of the *Sáma Veda*, held by the Hindus as the most ancient and most sacred text of their scriptures, within easy reach of oriental scholars.

The Agni Purāṇa which forms a sort of Cyclopædia of Sanskrit learning, is also in a forward state, and two fasciculi more will complete the work. Three Nos. were brought out by the editor, Dr. Rājendralāla Mitra, during the past year. This will be followed by an edition of the Vāyu Purāṇa simultaneously with an English translation by the same editor. The translation will appear under the auspices of the Oxford University authorities.

Paṇḍit Bharatachandra Śiromaṇi has brought out six fasciculi of his edition of the Vrata Khaṇḍa of Hemādri. The work is a digest of all rules and ordinances of ancient Hindu sages regarding fasts and penances. The quotations given in it are numerous, and of great interest with reference to the dates of the writers quoted.

Vāchaspati Miśra's gloss on the Vedānta Sūtras of Vyāsa, which was undertaken two years ago by Professor Bāla Śāstrī of Benares, has advanced by two Nos., and the Mīmāṃsā Aphorisms by one. Both these works will require some time yet before they are completed.

The progress made in the printing of Gobhila's Aphorisms on the domestic rites enjoined in the Sāma Veda, has also been slow, only one fasciculus having appeared during the past year. But that task has nearly been completed, and will be brought to a close in course of the current year. By way of appendices to the text, the editor proposes to print the Supplementary Aphorisms by the son of Gobhila, as also the Snāna and the Sandhyā Sūtras. The whole of these will not take up more than one fasciculus.

The Council have great satisfaction in announcing that Dr. Rājendralāla Mitra has at last completed his edition of the Lalita Vistara. The work was undertaken several years ago, and five fasciculi were published; but after that, owing to one cause or another, it had to be set aside from time to time. Annexed to the last fasciculus is an Introduction in which the editor has given a detailed account of the language, history, date and contents of the work, which will not fail to prove interesting to oriental scholars.

The following is a detailed list of the Bibliotheca Indica Publications issued during 1877—

A. Arabic and Persian.

AKBARNĀMAH, by Abul-Fazl-i-Mubārak-i-'Allāmī, edited by Maulawī 'Abdur-Rahīm, Calcutta Madrasah. Nos. 362 and 363, 374 and 375, Vol. I, Fasc. V to VIII; Nos. 379 and 380, Vol. II, Fasc. II.

Ā'ÍN-I-AKBARÍ, by Abul-Fazl-i-Mubārak-i-'Allāmī, edited by H. Blochmann, M. A. Vol. II, Nos. 370, 378, 387, Fasc. XX, XXI, XXII.

IÇĀBAH, or 'Biographical Dictionary of Persons who knew Muhammad,' by Ibn Hajar 'Asḳalānī, edited by Maulawī 'Abdul-Hai, Calcutta Madrasah, Old Series, Nos. 238, 240, Vol. II, Fasc. XVI, XVII.

B. Sanskrit Series.

SÁMA VEDA SAÑHITÁ, with the commentary of Sáyana Áchárya, edited by Paṇḍita Satyavrata Sámasramí, Nos. 356, 361, 365, 366, 369, 371, Vol. IV, Fasc. I to VI.

AGNI PURÁṆA, a system of Hindu Mythology and Tradition, edited by Rái Rájendralála Mitra, Bahádur, LL. D. Nos. 357, 373, 390, Fasc. IX to XI.

CHATURVARGA CHINTÁMAṆI, by Hemádri, edited by Paṇḍita Bharata-chandra Śiromaṇi, Nos. 360, 367, 372, 377, 381, 386, Vol. II, Fasc. VII to XII.

BHÁMATÍ, a gloss on Śaṅkara Áchárya's commentary on the Brahma Sútras, by Váschaspati Mísra, edited by Paṇḍita Bála Śástrí. Nos. 364, 384, Fasc. IV and V.

MÍMÁÑSÁ DARSANA, with the commentary of Savara Svámí, edited by Paṇḍita Mahesachandra Nyáyaratna. No. 368, Fasc. XIII.

GOBHILÍYA GRIHYA SUTRA, with a commentary by the editor, edited by Chandrakánta Tarkálankára, No. 383, Fasc. VII.

LALITA VISTARA, edited with an introduction by Rái Rájendralála Mitra, Bahádur, LL. D., No. 237, o. s. Fasc. VI.

List of Societies and Institutions with which Exchanges of Publications have been made during 1877.

Agra :—Agra Asiatic Society.

Batavia :—Batavian Society of Arts and Sciences.

Birmingham :—Institution of Mechanical Engineers.

Bombay :—Bombay Branch, Royal Asiatic Society.

———— :—Editor, Indian Antiquary.

Boston :—Natural History Society.

Bordeaux :—Bordeaux Academy.

Buenos Ayres :—Public Museum.

Brussels :—Royal Academy of Sciences.

———— :—Geological Society of Belgium.

Cherbourg :—Natural Society of Natural Science.

Calcutta :—Agricultural and Horticultural Society of India.

———— :—Geological Survey of India.

Christiania :—University Library.

Copenhagen :—Royal Society of Northern Antiquaries.

Cambridge :—University Library.

Colombo :—Asiatic Society, Ceylon Branch.

California :—Californian Academy of Arts and Sciences.

Dacca :—Editor, Bengal Times.

Dehra-Dun :—Great Trigonometrical Survey.

Dublin :—Royal Irish Academy.

——— :—Natural History Society.

Edinburgh :—Royal Society.

Frankfort :—Natural History Society.

Geneva :—Physical and Natural History Society.

Genoa :—Museum of Natural History.

Königsberg :—Physical and Economical Institution.

Lahore :—Agricultural Society of the Panjab.

Leipzig :—German Oriental Society.

Liège :—Royal Society of Sciences.

Leyden :—Royal Herbarium.

Liverpool :—Literary and Philosophical Society.

London :—Royal Society.

——— :—British Museum.

——— :—Royal Asiatic Society of Great Britain and Ireland.

——— :—Royal Institution.

——— :—London Institution of Civil Engineers.

——— :—Royal Geographical Society.

——— :—Museum of Practical Geology.

——— :—Zoological Society.

——— :—Statistical Society.

——— :—Geological Society.

——— :—Linnean Society.

——— :—Anthropological Institute.

——— :—Royal Astronomical Society.

——— :—Editor, Athenæum.

——— :—Editor, Geographical Magazine.

——— :—Editor, Nature.

Lyon :—Agricultural Society.

Moscow :—Society of Naturalists.

Madras :—Government Central Museum.

——— :—Literary Society.

Manchester :—Literary and Philosophical Society.

Munich :—Royal Academy.

Netherlands :—Royal Society.

New Haven, U. S. :—Connecticut Academy of Arts and Sciences.

Oxford :—Bodleian Library.

Paris :—Imperial Library.

——— :—Anthropological Society.

Paris :—Asiatic Society.

—— :—Geographical Society.

—— :—Ethnological Society.

—— :—Zoological Society.

Pisa :—Tuscan Society of Natural Sciences.

Stettin :—Entomological Society.

Stuttgart :—Natural History Society of Wurtemberg.

St. Petersburg :—Imperial Library.

———— :—Imperial Academy of Sciences.

———— :—Imperial Russian Geographical Society.

Stockholm :—Royal Academy of Sciences.

Switzerland :—Entomological Society.

Trieste :—Academy.

United States, America :—Geological Survey of the Territories.

Vienna :—Imperial Geological Institute.

—— :—Anthropological Society.

—— :—Imperial Academy of Sciences.

—— :—Zoological Society.

Washington :—Smithsonian Institution.

—— :—Commissioners of the Department of Agriculture.

Yokohama :—German Oriental Society.

—— :—Asiatic Society of Japan.

ABSTRACT OF PROCEEDINGS OF THE COUNCIL DURING 1877.

January 15th. Ordinary Meeting.

A proposal from the President of the Société Belge de Géographie for an exchange of publications with the Society was declined.

An exchange of publications with the Société Zoologique de France was sanctioned.

The continued payment to Islam Khan of his pension of Rs. 3 per mensem during 1877 was sanctioned.

At the request of Dr. Rájendralála Mitra, a sum of Rs. 500 was sanctioned for the purchase of 2 large book-cases for the accommodation of the Society's MSS. Library.

An estimate, amounting to Rs. 1548-7, from Messrs. Mackintosh, Burn and Co., for the erection of godowns was accepted.

February 1st. Ordinary Meeting.

The Secretary submitted a letter from T. W. Gribble, Esq., Post Master General of Bengal, asking whether the Council would have any objec-

tion to the erection of a small Government Post-Office, on a piece of their waste ground, and reported that the Finance Committee recommend the acceptance of Mr. Gribble's offer.

The letter was circulated to Members of the Council for an expression of opinion.

A request from Dr. F. Kielhorn, of Poona, for the loan of a MS. from the Society's collection, to assist him in preparing a critical edition of the Mahabhashya, was granted.

March 1st. Ordinary Meeting.

A letter was read from T. W. Gribble, Esq., Post Master General of Bengal, stating, in reply to the Society's letter No. 62, dated 13th February, 1877, that the Director General of Post-Offices in India had authorized him to offer Rs. 100 a month for the use of the Post-Office it was proposed to erect on a waste piece of the Society's ground.

The Secretary was requested to ascertain the cost of a building such as required by the Post Office, and to inquire whether the Post-Office would take it on a repairing lease for 14 or 21 years.

A letter was read from V. Sresnevesky, Esq., Secretary of the Imperial Russian Geographical Society, St. Petersburg, accepting the proposed exchange of publications with the Society.

The publications of the Society were ordered to be sent from 1870.

The Secretary reported that under the Museum Act, 22 of 1876, another Trustee on behalf of the Society had to be appointed.

Mr. T. S. Isaac was asked to accept the post.

The Minutes of the Society's Trustees of the Indian Museum on the state of the Zoological and Ethnological collections made over by the Asiatic Society to the Indian Museum were read, and a letter ordered to be addressed to the Government on the subject.

The Minutes of the Members of the Natural History Committee on a proposal from Mr. Grote regarding the publications of descriptions of a portion of the entomological Collections left by the late Mr. W. S. Atkinson were read, and it was agreed to publish an extra number of the Journal containing descriptions of the collection, and that the cost of coloured plates should be ascertained.

March 29th. Ordinary Meeting.

A letter was read from the Officiating Post Master General of Bengal, in reply to the Society's letter No. 140, dated 6th March 1877, stating that the rough plan of the Post Office submitted would suit, and that there was no objection to a long repairing lease on the terms proposed: but asking for a detailed plan of the building in order to specify certain small internal fittings.

It was ordered that the Officiating Post Master General of Bengal should be informed that the Council consider it undesirable to erect any such building in the Society's compound.

Dr. D. B. Smith, having resigned his seat in the Council, it was ordered that Mr. C. H. Tawney be asked to rejoin the Council.

A letter was read from the Secretary to the Government of the N. W. Provinces, stating that the N. W. Provinces Government was unable to undertake the publication of Beal's Oriental Biographical Dictionary, but was willing to make over the copyright to the Society or any other publisher, and assist pecuniarily as far as possible.

It was ordered that the N. W. Provinces Government be asked to send down the MS. in order to ascertain the cost of publication.

An exchange of publications with the "*Zeitschrift der Österreichischen Gesellschaft für Meteorologie*," and the "*Jahrbuch*" of the same Society was declined, but these publications were ordered to be subscribed for.

The Secretary reported that the Finance Committee recommend the selling of Rs. 1,000 of Government Securities, to meet current expenses, which was sanctioned.

The Secretary suggested that if a strip of ground along the Park Street side of the Society's compound were offered to the Municipality for the purpose of widening the street, the Municipality might perhaps help the Society to put up the railing and bear part of the cost.

This question was deferred till the next Meeting.

April 26th. Ordinary Meeting.

An exchange of publications was sanctioned with the "*Indian Mirror*" Newspaper.

The question of giving the Municipality a piece of ground along Park Street, in return for their paying the whole or part of the expense for erecting the railing along Park Street, was again brought up, and deferred, pending a survey by the Municipality of the ground in question.

A recommendation by the Finance Committee that a further probation of 6 months be allowed to Bábu Kedarnath Bysack the Cashier, was approved.

The selling out of Government Securities for Rs. 8,000 to meet expenses of repairs, recommended by the Finance Committee, was sanctioned.

The minutes of the Council on a memorandum from the Secretary regarding the building of a Post-Office, were read, and the former decision of the Council ordered to be confirmed.

Colonel J. F. Tennant, R. E., was elected a member of the Council, in place of Dr. D. B. Smith.

May 31st. Ordinary Meeting.

Letters were read from the Under Secretary to the Government of India, Department of Revenue, Agriculture and Commerce, forwarding letters from the Government of India, Military (Marine) Department regarding Deep-Sea Dredging fittings; and from the Deputy Master Attendant on the same subject.

It was ordered that the Under Secretary to the Government of India, Department of Revenue, Agriculture and Commerce, be informed that the question had been referred to a Sub-Committee who would communicate direct with the Superintendent of the Dockyard and report to the Council. The Sub-Committee to be composed of Messrs. W. T. Blanford, H. B. Medlicott, J. Wood-Mason, H. F. Blanford and Dr. J. Anderson.

The Secretary reported that the Library Committee had made the following recommendations:

That the original copy of "Jerdon's Birds of India," should not be lent out to Members, when a copy of Major Godwin-Austen's reprint had been procured.

That no more than two MSS. be lent out at the same time to one person without sanction of the Council.

That a special assistant be appointed to compile the Catalogue under Mr. Blochmann's supervision.

These proposals were sanctioned.

A recommendation by the Finance Committee that a further sum of Rs. 4000 of Government Securities should be sold out to meet claims on the Society, and repay the debt to the O. P. and Cons. Sans. MSS. Funds, was sanctioned.

The Secretary submitted a letter from M. Leroux of Paris, requesting to be appointed the Society's Paris Agent.

M. Leroux was ordered to be informed that he could not be appointed Agent, but that books would be supplied him at special rates.

An official form for the registration of the Society's property under Act VII, (B. C.) of 1876, was submitted by the Secretary, and it was ordered that Mr. J. O'Kinealy and the Collector of Calcutta should be consulted and a report made at the next meeting.

Mr. Blochmann reported that the publication of Mr. Beal's Biographical Dictionary was estimated at Rs. 4000. It was ordered that the Government of the N. W. Provinces should be informed of the cost of the work and requested to give a grant-in-aid of Rs. 1500, for which they would receive an equivalent number of copies when published. It was ordered that if the grant was sanctioned the work should be printed in the Bibliotheca Indica.

The Natural History Secretary reported, with reference to Mr. Grote's proposal for the publication of a portion of the late Mr. Atkinson's collection of *Lepidoptera*, that the following Resolution had been passed by the Natural History Committee :

"The Natural History Committee are unanimously of opinion, that is desirable, if practicable, that Mr. F. Moore's descriptions of the new species of moths from the collection of the late Mr. Atkinson should be published by the Society, but they do not consider it necessary that the whole should be printed in one piece, and brought out in England, as an extra number of the Journal. They recommend that the work be published in sections as the Society's funds may permit, either as a series of papers to be communicated in the usual way to the Journal, or as separate fasciculi of a new series of the "*Asiatic Researches*" in quarto form.

The Council agreed to publish the descriptions as a separate work in quarto form in numbers as their funds permitted. The printing to be done, in Calcutta, and proofs sent to Mr. Moore. The plates to be done in England. The question of commencing a new series of the *Asiatic Researches* to be referred to the Council at large for consideration.

June 28th. Ordinary Meeting.

At this Meeting the question of the erection of a Railing was again deferred, till the ground had been marked out and a definite proposal brought forward by the Municipality.

The Secretary reported that steps had been taken to have the Society's landed property duly registered and to obtain a dispensation freeing successive Secretaries of the Society from the necessity of registering themselves on behalf of the Society.

The Minutes of the Council on the question of recommencing a new series of the "*Asiatic Researches*," were read, and the following order passed :—That the new series of the "*Asiatic Researches*" be commenced, the size of the Philosophical Transactions. The quarto to be the same as the Philosophical Transactions, and 300 copies to be printed. £50 to be remitted to Mr. Grote.

The Natural History Secretary reported that the Sub-Committee for Deep-Sea Dredging, had recommended that application be made to Government for copies of all the Admiralty papers and publications relating to the equipment and fittings of the "*Challenger*," and for specimens of the apparatus to serve as models. The recommendation was approved.

The Secretary suggested that steps should be taken to secure the submission of papers before the General Meeting.

It was ordered that a notice should be printed on the cover of the Proceedings, that to ensure the reading of papers at the Monthly meeting

of the Society they should be sent to the Secretary at least a week beforehand.

July 25th. Ordinary Meeting.

A request from the Triplicane Society of Madras, asking to be supplied with the publications of the Society gratis, was declined.

A letter was read from the Assistant Secretary, asking for a room in the Society's House, which was sanctioned.

Dr. Rájendralála Mitra submitted a copy of a Catalogue of the Society's MSS. (Grammar) and proposed that the usual number of copies be sent to Government; that it be sold at Rs. 2 per copy; that copies be presented to all Institutes with which the Society exchange; that 20 copies be given to the author, and that the sale proceeds be applied to the publication of the subsequent volumes. These proposals were sanctioned.

August 30th. Ordinary Meeting.

The following gentlemen, proposed as Members of the Society at the last Monthly General Meeting, were duly elected by the Council under Rule 7.

Bábu Pratápa Narain Siñha, Bábu Jñanendra Chandra Ghosha, Bábu Kedarnátha Datta, Captain H. W. Clarke, R. E.

A re-exchange of publications was sanctioned with the American Oriental Society.

The Minutes of the Council were read, on Mr. Grote's letter about the papers by Messrs. Moore and Hewitson, the Secretary reporting that he had not remitted to Mr. Grote the £50 ordered at the last meeting, from want of funds, and asking permission to sell out Government Securities for the amount required.

It was ordered that Mr. Grote be asked to kindly give an estimate of the number of quarto plates required to illustrate these papers to the same extent as the octavo plates already sanctioned, and the cost of drawing, printing and colouring 325 copies.

On the recommendation of the Finance Committee a sum of Rs. 1,500 was ordered to be sold out of Government Securities, to refund advances from current revenue, to meet charges for repairs, &c.

Dr. Rájendralála Mitra submitted specimen sheets of his Analysis of the Hodgson collection of Buddhist MSS. and stated that the publication would cost Rs. 1200.

It was ordered that the cost of publishing be defrayed out of the Conservation of Sanskrit MSS. Fund.

September 27th. Ordinary Meeting.

A proposal from the Municipality to purchase for Rs. 800 a piece of ground belonging to the Society and required to widen Park Street, was declined.

Under Rule 7, the Council elected the following gentlemen Members of the Society.

Mr. John Hart and Mr. J. Digges La Touch, C. S.

October 1st. Ordinary Meeting.

A request from Professor Henry, Secretary of the Smithsonian Institute, to be supplied with certain Journals and Proceedings wanting in his set, was complied with.

A recommendation of the Finance Committee that on account of the excessive expenditure of the O. P. Fund, measures should be taken to reduce expenses for a time, was agreed to, and the publications ordered to be stopped for three months.

Bábu Kedarnáth Bysack was confirmed in the post of Cashier to the Society.

Read the minutes of the Council on the expense of the printing and plates of the Atkinson Collection of *Lepidoptera*. It was ordered that the Society could not afford more than £300, including the printing. The number of copies may be reduced to 225, quarto size, including 25 authors' copies. The expenditure to be spread over three years—1877-78-79. The work to be printed in England; the plates to be headed—Asiatic Society of Bengal. The question whether the work is to form Part I of the Asiatic Researches is to be circulated to Council for re-consideration at the next meeting. Rs. 500 of Government Securities to be sold out and £50 to be remitted to Mr. Grote.

On the recommendation of the Finance Committee an addition of Rs. 5 per mensem to the pay of the Assistant Cashier was sanctioned, to be payable by the Society, the balance of his pay being paid by the O. P. Fund as at present.

November 30th. Ordinary Meeting.

On the recommendation of the Finance Committee a bill for Rs. 874-4, expended in the publication of a Catalogue *raisonné* of the Society's Sanskrit MSS., was charged to the Conservation of Sanskrit MSS. Fund, in accordance with Government orders on this subject.

The pay of Jussim, Durwan, was ordered to be increased from Rs. 6 to Rs. 7 a month.

The Secretary submitted an Index of 22 vols. of the Society's Journal, from vol. 24 of 1855 to vol. 45 of 1876, compiled by the Assistant Secretary, and it was ordered to be circulated to the Council with a specimen and a report by the Secretaries.

The Minutes of the Council upon the question of starting a new series of the Asiatic Researches were read ; and it was ordered, " That the papers by Messrs. Moore and Hewitson should be printed as an independent publication, and not as Vol. I of a new series of the Asiatic Researches. That a sufficient number of plain paper copies should be printed for circulation to Members of the Society, in addition to the colored copies ordered last meeting, and that Members be invited to say whether they wish to have colored copies, on paying the extra cost of the coloring, estimated at from 8 to 10 rupees.

The Minutes of the Council were read on the question of collecting the subscription of Mofussil Members annually, and it was ordered that the present system be continued.

December 30th. Ordinary Meeting.

Applications from the Secretary, Canadian Institute, Toronto, and from the Secretary to the Davenport Academy of Natural Sciences for an exchange of publications, were declined.

An exchange of publications with the Academy of Natural Sciences, Philadelphia, was sanctioned.

A petition from Islam Khan, praying for the continuance of his pension during 1878, was granted.

The Secretary reported that the Library Committee recommend the calling in of all books at present on loan with Members for the purpose of being incorporated in the new Catalogue ; which was sanctioned.

The Secretary reported that the Finance Committee recommend that the sum of Rs. 1,26,000 of Government Securities should now be transferred to the Permanent Reserve Fund. This sum includes Rs. 2,000 from admission and compounding fees funded before the receipt of Rs. 1,50,000 from Government, and Rs. 2,782-13-7 since received on the same account. Of the sum forming the Permanent Reserve Fund, Rs. 1,07,000 would be in 4 per cent. and the remaining in 5 per cent. The recommendation was sanctioned.

There was some delay in taking the votes for the election of officers and members of the Council for 1878, owing to a misapprehension caused by the note on the papers circulated to Resident members in the usual way

before the meeting, and to an objection raised by Dr. Waldie, to the officers being elected collectively, as usual, and not in due sequence, as laid down in rule 44. The Scrutineers finally reported the result of the election as follows :—

W. T. Blanford, Esq., F. R. S.,	<i>President.</i>
Dr. Rájendralála Mitra, Rai Bahadur, C. I. E.,	} <i>Vice-Presidents.</i>
H. B. Medlicott, Esq.,	
T. S. Isaac, Esq.,	
H. Blochmann, Esq., M. A.,	} <i>Secretaries.</i>
Capt. J. Waterhouse,	
R. Lydekker, Esq.,	
E. Gay, Esq.,	<i>Treasurer.</i>
W. T. Blanford, Esq., F. R. S.,	} <i>Members of Council.</i>
Dr. Rájendralála Mitra, Rai Bahádur, C. I. E.,	
H. B. Medlicott, Esq., M. A.,	
T. S. Isaac, Esq.,	
H. Blochmann, Esq., M. A.,	
Capt. J. Waterhouse,	
Dr. T. R. Lewis,	
J. O'Kinealy, Esq., C. S.,	
Bábu Prannáth Pandit,	
Dr. J. Anderson,	
R. Lydekker, Esq.,	
Col. J. T. Walker, C. B., R. E., F. R. S.,	
H. F. Blanford, Esq.,	
E. Gay, Esq., M. A.,	
A. W. Croft, Esq., M. A.	

Messrs. D. Waldie and J. Blackburn, were elected to audit the Annual Accounts.

The PRESIDENT said—That he regretted that his approaching departure from India and the pressure of business which it involved, prevented him from preparing any address on the occurrences of the past, such as was sometimes laid before them. So far as the affairs of the Society were concerned he could only refer the meeting to the report which had just been read and which he thought he might justly call satisfactory. His duty was now to vacate the chair in favour of Mr. Blanford. In doing so, he begged to express to the Society his sense of the high honor which they had done him in so often more than once electing him to office as President and as a Member of their Council. The duties of those offices he had

fulfilled to the best of his ability with much pleasure, and he could only regret that long periodical absences from Calcutta and the pressure of official duties had prevented his doing so more energetically. As it was, he could only express his sense of the kindness with which they had made allowance for his shortcomings. It was to himself a matter of pain to cease from personal action in the affairs of the Society, in which he took that deep interest which they so thoroughly deserved. It was possible indeed that greater leisure in the future might enable him to give more attention to various branches of the enquiries to which the Society devoted itself, and if he was able to do so and to make any observations which he thought of interest, he would gladly from time to time place them at the disposal of the Society of which he hoped always to remain a member.

There was one last motion which he would ask permission to make before leaving the chair. General Thuillier, who had so long and so usefully been connected with the Society, and to whom they were indebted, not only for his labours as their President and on the Council, but for much aid which his official capacity enabled him to render, was quitting India tomorrow morning. He would ask the Society to pass a vote of thanks to General Thuillier and an expression of regret at losing his active assistance. If this motion was carried it would, of course, be formally transmitted in due course by the Secretary, but there was no time for this to be done while General Thuillier was in the country. He begged therefore to be allowed to communicate the vote to General Thuillier personally, as he hoped to see him before his departure.

The vote was put and carried. The PRESIDENT then said that he begged now to vacate the chair to Mr. Blanford, whom, he felt confident, the Society would find worthy of the high honor they had conferred on him.

The Meeting was then resolved into the Ordinary Monthly General Meeting.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced—

From Commander R. Dundas Taylor, a Chart of Narsapur Point and Palmyras Point. The Vizagapatam, Ganjam and Orissa Coasts, 1877, compiled by R. C. Carrington.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected Ordinary Members.

Colonel the Hon'ble Sir Andrew Clarke, R. E., K. C. M. G., C. B., C. I. E.

The Hon'ble H. T. Prinsep.

The following are candidates for ballot at the next Meeting :—

1. W. M. Souttar, Esq., C. S., Magistrate and Collector of the Twenty-four Pergunnahs, proposed by the Hon'ble Sir E. C. Bayley, K. C. S. I., seconded by J. O'Kinealy, Esq.

2. James Wilson, Esq., C. S., Assistant Settlement Officer, Gurgáon, Punjáb, proposed by Denzil Ibbetson, Esq., seconded by A. G. Thomson, Esq.

3. A. Campbell, Esq., Officiating Deputy Commissioner, Goalpara, Assam, proposed by W. McGregor, Esq., seconded by Capt. J. Waterhouse.

4. H. G. Keene, Esq., C. S., District and Sessions Judge, Agra, proposed by H. Blochmann, Esq., seconded by Dr. Rájendralála Mitra.

5. Babu Adharlal Sen, B. A., proposed by Roper Lethbridge, Esq., C. I. E., seconded by Dr. Rájendralála Mitra, Rai Bahadur, C. I. E.

6. Surgeon-Major E. J. Gayer, M. D., Calcutta, proposed by Capt. J. Waterhouse, seconded by Dr. T. R. Lewis.

7. The Hon. H. A. Cockerell, C. S., Calcutta, proposed by H. H. Locke, Esq., seconded by Capt. J. Waterhouse.

8. G. W. Allen, Esq., proposed by W. T. Blanford, Esq., seconded by H. H. Locke, Esq.

9. W. Hoey, Esq., Asst. Commissioner, Unao, Oudh, proposed by Capt. J. Waterhouse, seconded by H. Blochmann, Esq.

The SECRETARY read the following report of the Stoliczka Memorial Committee, and laid before the meeting a statement of the English and Indian accounts.

Report of the Stoliczka Memorial Committee.

“The Stoliczka Memorial Committee have the pleasure to report that the marble bust of the late Dr. Stoliczka, by Mr. Geflowski, has been received from England, and is as good a likeness as could have been expected, considering the very difficult conditions under which the sculptor had to work, owing to the want of proper photographs.

“The portrait by Mr. Dickinson, (of which a photograph has been presented to every subscriber) was received in March last, and now hangs in the Society's Meeting-room.

“ The Committee have examined the accounts, as annexed to this report, and find them correct.

“ When all expenses have been paid there will remain a balance of Rs. 317-8-8, besides £2 in England. The Committee would recommend that the subscribers should be asked if they have any objection to this balance being added to the Asiatic Society's Servants' Charitable Pension Fund.

“ The Committee have to warmly acknowledge the valuable services rendered by Mr. A. Grote, Dr. Oldham, Dr. Dobson and other members of the London Committee, and to tender their thanks for the great care and trouble these gentlemen have taken in carrying out the wishes of the subscribers.

STOLICZKA MEMORIAL FUND ACCOUNT.

India.

RECEIPTS.				EXPENDITURE.			
Subscriptions realised, ..Rs.	2,787	0	0	Remitted to Mr. Grote £200,	2,323	6	7
				Printing Charges,	44	14	0
				Bourne and Shepherd, for			
				Photographs,	37	0	0
				King, Hamilton and Co., for			
				landing and clearing			
				charges,	29	15	3
				Freight and Miscellaneous,	25	12	0
				Postage,	8	7	6
					2,469	7	4
				Balance, ..	317	8	8
Rs. ..	2,787	0	0	Rs. ..	2,787	0	0

Europe.

RECEIPTS.				EXPENDITURE.			
Subscriptions realised in				Mr. Dickinson for Portrait,	£126	0	10
England,	£76	0	0	Mr. Geflowski for Bust, ..	105	0	0
Remitted from India,	200	0	0	Ditto for Pedestal,	17	0	0
				Mr. Burlett's Bill,	4	4	0
				Woodbury Company for			
				copies of Printing,	9	8	6
				Messrs. King and Co. for			
				Package and Freight, ..	11	14	0
				Postage and Miscellaneous,	0	12	7
					273	19	11
				Balance, ..	2	0	1
					£276	0	0

DR. D. BRANDIS announced to the Meeting that news had been received of the death at Penang of the late Mr. S. KURZ, Curator of the Herbarium, Botanic Gardens, Calcutta, and read the following sketch of his life :

SULPIZ KURZ, Curator of the Herbarium at the Botanic Gardens, Calcutta, was born at Augsburg, in Bavaria, on the 5th May 1834. His father died early, and the boy attended school at Munich where his mother had settled. At an early age he commenced collecting objects of natural history, especially insects. After leaving school he attended lectures at the University of Munich, and chiefly devoted himself to the study of Botany, Mineralogy and Chemistry. In 1854 misfortunes in his family compelled him to abandon his studies, and he went to Holland where he worked as an apothecary and, after mastering the Dutch language, enlisted in the subordinate Medical Service of the Dutch Colonial Army. He landed at Batavia in September 1856, and was sent to Banka in March 1857, where he remained two years. During that time his work was light, and he was able to explore the island and to make botanical collections. In 1859 he was recalled to Batavia and joined the Military expedition to Bori in Celebes. In September 1859 Kurz returned to Batavia, and was appointed as an Assistant on the Staff of the Botanic Garden at Buytenzoorg. Here for the first time in his life he had the advantage of working under the guidance of other botanists, and with the assistance of a large library and a rich herbarium. He devoted himself principally to Ferns, Bamboos, Musaceae, Pandaneae and other difficult groups. A few years later Dr. Thomas Anderson, the Superintendent of the Botanical Gardens, Calcutta, came to Java in order to study the system of Cinchona cultivation which had then for some time been established by the Dutch authorities. He induced Kurz, with the permission of the Dutch Government, to accept the appointment which he held at the Herbarium of the Calcutta Botanical Gardens until his death. In October 1863 Kurz left Java, and joined his new appointment at the Gardens early in 1864.

Before his transfer to Calcutta he had not published much, a few papers only on the vegetation of Banka and other matters had been printed in the "*Naturkundige Tydschrift voor Nederlandsch Indie*." In Calcutta, however, he commenced a series of important botanical publications, which appeared in English and Continental Periodicals, chiefly in the London Journal of Botany, the Proceedings of the Linnean Society, in Miquel's Annales, the Flora of Regensburg and the Botanische Zeitung. But his later and most important papers were published in the Journal of the Asiatic Society, of which he became a member in 1869.

In 1866, Kurz was deputed by the Government of India to Port Blair, in order to study the vegetation of the Andaman islands. He spent the months of April and May on that duty, and the results of his explorations were recorded in a most valuable Report which was published by Government in 1870. While engaged in examining the interior of South Andaman, he was seized by the Burman convicts, whom the Superin-

tendent of Port Blair had given to assist him in his work, and was left tied hand and foot in the jungles on the ground. These and subsequent circumstances, which prevented the more extensive excursions which he had projected through the islands, obliged Kurz to return to Calcutta sooner than he had intended.

In 1867, the Government of India decided to employ him on the preparation of a hand-book, intended chiefly for the use of forest officers, of the trees, shrubs and climbers growing in the forests of British Burma. To this new task, Kurz devoted himself with his usual ardour and enthusiasm, and his researches regarding the Flora of Burma may justly be regarded as the most important work of his life. From December 1867 to June 1868, Kurz explored the forests in the province of Pegu and part of those in Martaban. But when after his return to Calcutta he examined and arranged the rich materials collected by him, he found that many doubtful points remained, and he was accordingly deputed on a second tour to the same districts, which lasted from December 1870 until May 1871.

Besides the materials collected by himself, Kurz had the advantage of consulting large collections made by others in Burma, and he was thus enabled to describe numerous new genera and species. A number of Burmese plants collected by him are described by other Botanists and deservedly bear his name. Between 1872 and 1877 he contributed two series of valuable papers to the Journal of the Asiatic Society. One series he called "New Burmese plants," and the other, "Contributions towards the knowledge of the Burmese Flora." A general account of his researches was embodied in a quarto volume published by Government in 1875, under the title "Preliminary Report on the Forest and other vegetation of Pegu." This work contains an admirable account of the vegetation in all parts of that province, as well as a most useful list of vernacular (Burmese) names of plants with their systematic names.

The chief results of his labours in regard to the Burma Flora, however, were embodied in his Forest Flora of British Burma, a work, regarding which it is not too much to say, that it has placed the name of Kurz in the first rank of Indian Botanists. This work was published towards the close of last year in two volumes, by order of the Government of India. It contains full and clear descriptions of 2,000 species, and will for a long time to come remain a standard work of reference for all interested in the vegetation of British Burma and the adjacent countries.

In 1875, Kurz took three months' leave and devoted it to a botanical exploration of the Nicobars, but exposure and fatigue in the unhealthy climate of those islands brought on a severe attack of fever which much weakened his constitution. In 1876, he contributed to the Journal of the Asiatic Society a paper on the Vegetation of the Nicobars, based chiefly

upon the collections made by the Austrian Naturalists, attached to the Novara expedition. These collections had been sent to him for publication by the Director of the Imperial Museum at Vienna.

On the 12th November 1877, shortly after his *Forest Flora* had been published, Kurz left Calcutta on leave to visit the Straits Settlements. He reached Penang on the 12th December, but was taken ill and died at that place on the 15th January 1878, at the age of 43 years. An uninterrupted residence in the tropics of 21 years and constant exposure on his botanical explorations had undermined his constitution. His ardour in the pursuit of Botany was irrepressible, and he rarely thought of health or comfort on his expeditions.

He was Member of several learned Societies; his fellow Botanists in England, the Continent of Europe and in India will mourn his loss, and by many of his friends outside the circle of those interested in science, he will long be remembered by his enthusiastic and single-minded devotion to the science, which from early youth was the aim and object of his life.

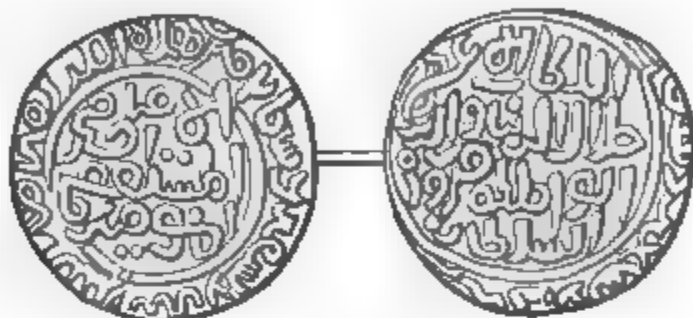
Mr. BLOCHMANN read an extract from a letter from Mr. Grierson on the Rangpúrí Genitive.

"I find I was wrong when I said that the Rangpúrí "आपनकार" is a double genitive. It is no such thing. I have traced it up here in colloquial आपनकरे, which is evidently Prákṛit क ल क and Sansk. क्त. Hoernle mentions this, but says that करे is only found in Tulsí Dás, while here it exists in every day talk. I think this fact is worth preserving, though hardly worth making a separate paper about."

Mr. BLOCHMANN exhibited a unique gold coin struck by Jalál-uddín Fírúz Sháh (II) of Dihlí. He said—'The coin which I now exhibit belongs to Mr. Jos. T. Tripe, of Dynechupra, Tirhut. Mr. Tripe, on his last visit to Calcutta, shewed me about sixty or seventy gold coins belonging to him. They were mostly gold-muhurs struck by the Emperor Akbar, in splendid preservation, the specimens belonging to the years between 970 and 987 H. There were also several gold-muhurs struck by Sháhjahán, a gold tánkah of Muhammad Sháh Tughluq, and the Fírúz Sháhí now exhibited. The remarks made by Mr. Thomas in his 'Chronicles of the Pathan kings,' p. 144, lead me to believe that Mr. Tripe's coin is unique.'

'Mr. Tripe has also since sent me a large collection of silver coins struck by Sher Sháh, Islám Sháh, Muhammad Sháh, Bahádur Sháh, &c., containing several new types, which I hope to lay before the next meeting. The best thanks of the Society are due to Mr. Tripe for allowing these coins to be exhibited.

Gold coin struck by Fíruz Sháh II, of Dihlí, A. H. 692 [A. D. 1293]
 GOLD. WEIGHT, 168·61 grains. Unique. Mr. Jos. T. Tripe, of Dynechu-
 pra. (*Vide* Thomas, 'Pathan Kings', p. 144, and Pl. II, No. 50.)



OBVERSE—الامام المستعصم امير المؤمنين

Margin—ضرب هذه السكة بحضرة دهلي في سنة اثنين وتسعين وستمائة

REVERSE—السلطان الاعظم جلال الدنيا والدين ابو المظفر فيروز شاه السلطان

Margin—the same as the margin of the Obverse.

OBVERSE—*The Imám Musta'cim, Commander of the Faithful,*

Margin—*This coin was struck at Dihlí, the capital, in 692.*

REVERSE—*The great king Jalál-uddunyá wad-dín Abul-Muzaffar Fíruz Sháh.*

Though Al-Musta'cim, the last Khalífah of Baghdád, had lost his empire and his life in the invasion of the Mughuls (Mongolians) under Hulágú Khán in 656 H., the kings of India continued his name on their coinage for more than sixty years, just as Indian princes until lately continued to strike coins in the name of Sháh 'Alam. During the eighth century of the Hijrah, Indian kings applied to, and received from, the Fátimite Sultáns of Egypt, *sanads* of investiture; and we see from the poems of Badr-i-Chách, the poet-laureate of Ghiyás-uddín Tughluq how great a value the Muhammadans attached to such *sanads*. Mubárah Sháh (*vide* Thomas, *l. c.*, p. 255) appears to have been the first king of Dihlí who assumed the title of Khalífah. After him the title becomes quite common, the phrase used on the coins being *خليفة الله بالحجة والبرهان* 'the Representative (*Khalífah*) of God by proof and evidence'. Akbar also used it in that peculiar sense which the establishment of his 'Divine Faith' gave it; but I have not seen it on the coins of his successors, though it often occurs applied to them in the prefaces of Muhammadan works. Now-a-days, the grand title of Khalífah has sunk so low as to be applied to master tailors, cooks, and other menial servants. The Sultáns of Turkey appear to claim it as having descended to them from the Egyptian Khalífahs; but from the preceding examples, it is clear that any Muhammadan king may assume the title and the exercise of the spiritual functions which the title is supposed to imply.'

The following papers were read :—

1. *Aberrant Dentition of Felis Tigris*.—By R. LYDEKKER, B. A.

(Abstract.)

The author exhibited the lower jaw of a Tiger from Burma, which had the peculiarity of bearing on one side an additional promolar tooth in advance of the two normal teeth. The presence of this additional tooth can only be explained on the hypothesis of a "reversion" to the extinct Miocene and Pliocene genus *Pseudælorus* in which three lower premolars were normally developed.

The paper will be published in full, with plate, in Journal Part II.

2. *Figure of Buddha recently found at Sarnáth*.—By H. RIVETT-CARNAC, C. I. E., M. R. A. S., &c.

In the account of the Buddhist remains at Sarnath, near Benares, published in the Journal, Asiatic Society, Vol. XXXII, General Cunningham noticed the desirability of clearing away the rubbish at the foot of the great *Stupa* called *Dhameh*, as he was of opinion that possibly some of the statues of Buddha which once occupied the eight niches of the tower might be found among the debris. It may, therefore, be of interest to the Asiatic Society to learn that during a visit paid to Sarnáth last Christmas by my wife and myself, in company with the Rev. J. C. and Mrs. Murray-Aynsley, who are travelling through India, a stone figure of Buddha was discovered amongst the ruins, in as nearly as possible the exact position indicated by General Cunningham. Whether this figure once occupied one of the eight niches of the tower, or belonged to some other portion of the building, may perhaps be determined with the help of the sketch now sent, together with a brief notice of the figure and a statement of the position in which it was found.

The figure was discovered by Mrs. Murray-Aynsley, whose attention was attracted by the pattern of a necklace carved on a piece of sandstone, which she found embedded in the debris on the south side of the trench cut by General Cunningham, many years ago, leading to the passage on the east side of the *stupa*. The rain has apparently washed away the soil from the sides of the trench and had left this fragment exposed, at a depth of about two feet from the level of the top of the rubbish by which the tower is now surrounded. At first it was thought that the sculptured necklace was a small fragment only, but on trying to extricate it, it was found necessary to remove the stones and bricks at the top and sides, and by degrees the figure, of which a drawing is annexed, (Plate I) was with some little difficulty extricated.

The block is of red Chunar sandstone, of the same character as that employed in the well-known tracery which still ornaments the *stupa*. The sketch has been drawn to scale, and it will be seen that the stone, in its present state, is 2 feet, 4 inches in height by 1 foot, 8 inches in breadth, and consists of a carved base 6 inches in height surrounded by a further leaf-shaped base 5 inches in height, on which is a seated figure of Buddha. The block has been much broken, but in the centre of the lower base the lotus, "wheel-ornament" or "disc," so often seen on Buddhist carving, is intact. The remains of what would appear to have been a pedestal, or support to the disc, similar to those which support the discs on the summit of the Northern Gateway of Sanchi (see frontispiece, Fergusson's *Tree and Serpent Worship*) can still be distinguished. On either side of the disc are the remains of three figures. These figures have been much defaced, but it would appear that, when intact, each figure had an arm placed on the shoulder of its neighbour, an arrangement similar to what I recently noticed on some old Buddhist pillars at Benares.

The legs of the seated figures of Buddha are in fair preservation. They are crossed in the conventional attitude. The soles of the feet are turned up, and in the centre of each is carved a small flower (?). The arms have been broken off, but the thumb of the right hand is in good preservation, and the remains of the finger of the left hand are discernible, suggesting that the figure was in the conventional form of "Buddha the teacher" as described by General Cunningham. The necklace which first attracted Mrs. Murray-Aynsley's attention, is delicately carved and is in good preservation. The head has been broken off, and, as with it the upper portion of the block has been carried away, it is impossible to say whether the head was ever surmounted by an aureole or not.

At the back of the figure, the carved tracery which forms a panel on each side of the seated Buddha, is preserved, and on the left hand side is found the lower portion of a small carved figure, standing on a bracket carved out of and forming part of the original block. Our time was limited, but some search was made in the hope of finding fragments of the head aureole, or of other parts of the carving. Nothing was found. Careful and more extended search would, however, doubtless bring many other interesting remnants to light, and possibly the missing head of the figure.

On the sketch will be found, drawn in blue, the outline of the niche, and pedestal of one of the eight niches of the *stupa*, each niche being, according to General Cunningham, $5\frac{1}{2}$ feet in length, and the same in breadth. The stone pedestals, which are still *in situ* in most of the niches, are a little more than 1 foot in height and nearly 4 feet in length. The outlines of niche and pedestal have been drawn to scale, below and around the sketch

of the seated figure, so as to assist in determining whether this is one of the missing figures belonging to the niches.

At first sight the figure will, doubtless, be pronounced somewhat small, and it will suggest itself that, as each niche was provided with a large pedestal, the carved base below the figure, as shewn in the drawing, would be unnecessary. Then, too, it will suggest itself that the figures on the lower pedestal are small for a piece of sculpture to be placed on a niche at a height of 24 feet from the ground.

General Cunningham, as the following extract will shew, expected that the figures of the niches would be of life size. He wrote in the Volume of the Society's Journal above quoted.

"The lower part of the monument has 8 projecting faces, each 21 feet, 6 inches in width, with intervals of 15 feet between them. In each of the faces, at a height of 24 feet above the ground, there is a semi-circular headed niche, $5\frac{1}{2}$ feet in width and the same in height. In each of the niches there is a pedestal, one foot in height, and slightly hollowed on the top, to receive the base of a statue, but the statues themselves have long disappeared, and I did not find a fragment. There can be little doubt, however, that all the 8 statues represented Buddha the preacher in the usual form, with his hands raised before his breast, and the thumb and forefinger of the right hand placed on the little finger of the left hand, for the purpose of enforcing his argument. Judging by the dimensions of the niches the statues must have been of life size."

Although the figure now found is smaller than might be expected, still the following points are in favour of its having once occupied one of the niches. It was found in the position indicated by General Cunningham, *i. e.*, amongst the debris at the base of the *stupa* almost immediately below a niche, and in just the position in which one might expect to find a figure which had been thrown down from the niche and broken by Mahomedan iconoclasts, or hostile Brahmans.

The stone is of the same description as that with which the other portions of the structure are ornamented. Although the carving on the head and base of the figure is somewhat minute for an ornament to be placed at a height of 24 feet from the ground, still, equally delicate treatment of detail is sometimes met with in similar positions on Buddhist buildings. Again it is not improbable that the head was surrounded by an aureole, which would bring the total height of the carving up to $3\frac{1}{2}$ feet. This added to another foot, the height of the pedestal, (which is still to be seen in position) would bring the sculpture within 1 foot of the top of the niche. At the same time it must be admitted, that the breadth of the figure is hardly in proportion to the size of the niche.

The subject is, however, one on which it is hoped that Members of the Society will be able to form an opinion from the information now placed before them.

The figure has been taken into Benares, and made over to Captain Boileau, R. E., who has been good enough to take charge of it, until the wishes of General Cunningham as to its disposal are known.

It appears desirable to take advantage of the present opportunity to bring to the notice of the Society, that, unless steps are promptly taken to preserve the outer stone carving of the Dhameh *stupa*, this unique specimen of ancient Indian art will soon be seriously damaged. When we were at Sarnáth, some of the large stones of the well known beautiful tracery appeared to be on the point of falling out.

The expenditure necessary for saving this portion of the building from ruin would be inconsiderable *now*. If the stones are once allowed to fall to the ground, the expense, and difficulty of restoration will become enormous.

3. *A few Magnetic Elements for Northern India.*—By R. S. BROUGH.

Having recently had occasion to measure the dip of the needle and the strength of the horizontal component of the earth's magnetic force at Calcutta, Jubbulpore and Allahabad, with a view to ascertaining to what extent the indications of an arbitrarily calibrated galvanoscope, uncorrected for the local value of the earth's magnetism, would be trustworthy, I think it desirable to put the results on record.

The horizontal intensity was measured with a Kew-pattern portable unifilar magnetometer, and the observations have been corrected for temperature, torsion and scale error—

STATIONS.	Longitude.	Latitude.	Date.	Horizontal force in dynes.	Dip.
Calcutta,	88° 22' 50"	22° 32' 32"	Jan. 1878	0·37158	28° 59' 30"
Jubbulpore, ..	80° 00' 00"	23° 10' 00"	Dec. 1877	0·36667	29° 23' 30"
Allahabad,	81° 54' 12"	25° 27' 43"	Dec. 1877	0·35915	33° 18' 45"

Dividing the horizontal component by the cosine of the dip, we obtain the total force thus :—

Calcutta : 0·42482 dyne
 Jubbulpore : 0·42084 „
 Allahabad : 0·42977 „

There are on record several observations of the dip in Calcutta, which it will be interesting to bring together here.

The dip appears to have been measured for the first time when the French Corvette "*La Chevette*" visited these waters in 1827, by M. de Blossville who found it to then be*

26° 32' 38"

Ten years later, in 1837, on the occasion of the visit of another French Corvette "*La Bonite*" to the Hugli river, the dip was measured at Kalgachia (Diamond Harbour) by the chief Hydrographer, who found it to be†

26° 39' 04"

exhibiting a change of only 0° 06' 26 from the result of the earlier measurement.

The next and most recent measurement, was made by the brothers Schlagintweit in March 1856 and in April 1857, in which years it was found to be respectively‡

28° 06' 43"

and 28° 22' 56"

The same observers found the dip at Jabalpur in December 1855 to be§

28° 31' 08"

Their measurements of the horizontal force gave :—

0·37386 dynes at Calcutta in March 1856

0·36644 „ „ in April 1857

0·39959 „ Jabalpur in December 1855

A very valuable series of observations was made in 1867-68 by the late Captain Basevi, R. E., under the orders of Colonel J. T. Walker, C. B., R. E., Superintendent of the G. T. Survey (now Surveyor-General of India,) at 14 stations extending from 15° 6' to 30° 20' North latitude,|| but none of them are coincident with the three stations under consideration.

The values of the dip and horizontal intensity at the limiting stations of the series were as follow :—

STATIONS.	Latitude.	Longitude.	Date.	Horizontal intensity.	Dip.
Namthabad, ..	15° 06' 00"	77° 36' 00"	April 1868	0·37401	11° 40' 56"
Deyrah,	30° 20' 00"	78° 06' 00"	Jan. 1867	0·33604	41° 27' 34"

* "Asiatic Researches" Vol. XVIII, Part I, p. 4.

† Proceedings, Asiatic Society of Bengal, Wednesday, 3rd May, 1837.

‡ Observations in India and High Asia, Vol. I.

§ *Loc. Cit.*

|| General Report of the Operations of the Great Trigonometrical Survey of India during 1867-68.

4. *Description of two apparently new Mammals from Tenasserim.*—By
W. T. BLANFORD, F. R. S.

PRIONODON MACULOSUS, sp. nov.

Allied to *P. gracilis*, but much larger, and much darker in coloration, the upper parts being blackish brown, broken up into large spots and bands by greyish white lines, whereas in *P. gracilis* the upper parts are pale with black patches. In the latter too the pale rings on the tail are broader than the dark rings, and there is a long white tip, longer than the last dark ring, whereas in *P. maculosus* the reverse is the case, the dark rings being nearly twice as broad as the light. The only other species, *P. pardicolor* of the Himalayas, is much smaller than *P. maculosus*, it has more numerous rings on the tail, and the upper parts are marked with more or less rounded spots.

In *P. maculosus* there are two broad dark stripes down the back of the neck, divided by a narrow white band, with a faint mesial streak, which becomes a double line of elongate spots between the shoulders. The two dark bands pass into the dark patches of the back; on each side of these bands is a white, rather wavy stripe, commencing at the ear and continued along the neck, over the shoulder, and down the side to the thigh, becoming more irregular behind, beneath this again is a dark band somewhat broken up into spots in front and on the sides. The back is crossed by six transverse white bands, the first five equidistant, the first joining the central neck streak, the hinder all connected with the lateral white band. There are small dark spots on the fore neck forming an imperfect gorget, also spots on the lower portion of the sides and outside of the limbs. On the tail are seven white rings and a very short white tip. Nose and crown dark brown, forehead between the eyes and cheeks light brown, a dark ring round the orbit, with a streak running back to below the eye and another passing up to the crown. Ears rounded, blackish brown outside and near the margin inside, a few long pale hairs on the inner surface of the ear conch; whiskers long, extending to behind the ear, the upper brown, the lower entirely white. Soles, except the pads, covered with fine hair.

Fur soft and short, not more than half an inch long on the back, ash grey at the base, black or white at the tip on the upper parts, white throughout below. The following dimensions were taken on an adult male preserved in spirit:—

	inches.
Length from nose to rump over curve of back,.....	18·25
Ditto of tail without the hairs at the end,	16·
Ditto of hairs at end,.....	0·75

Total,	35·
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Length of ear from orifice,.....	1·05
Ditto of hind foot and tarsus,	2·8
Ditto of skull,	3·
Breadth of do. across zygomatic arches,.....	1·5

Two specimens have been examined ; one a very beautiful skin belonging to Mr. Hume, and collected by Mr. W. Davison at Bankasun in Southern Tenasserim, the other a perfect male in spirit obtained by Mr. Limborg west of Moulmain. Both appear fully adult.

SCIURUS RUFIGENIS, sp. nov.

This squirrel is of medium size, the body being nearly equal in length to *S. caniceps* and *S. atridorsalis*, but the tail is much shorter, its length, without including the hairs at the end, being considerably less than that of the head and body. Fur soft throughout, hairs on the tail distinctly distichous.

Upper parts dark olive, grizzled or punctulated, cheeks ferruginous, whiskers black, ears thinly clad, not tufted, a small patch of silky white hairs behind each ear, often concealed by the ear conch, lower parts white, tail hoary above, chestnut below, the hairs above being black with a white ring near the base and a white tip, and ferruginous below, tipped black and white. Throat and chin sometimes slightly marked with rufous. Nose to insertion of tail 8, tail without terminal hairs 6, hind foot 1·8, ear from orifice 0·8. The dimensions were taken by Mr. Davison before skinning.

The skull, which has a peculiarly elongate nose, much longer and narrower than in the other Tenasserim squirrels, is 2·07 inches long and 1·2 broad across the zygomatic arches.

This species has only been obtained on the slopes of Muleyit, a lofty mountain about 60 miles west of Moulmain. Four skins were collected by Mr. Davison and one by Mr. Limborg. All were procured in dense forest, at an elevation of above 5000 feet.

The reading of the following papers was postponed.

Notes on the Erratics of the Upper Punjab.—By A. B. WYNNE, Esq.,
F. G. S., &c.

Stray Aryans in Tibet.—By R. B. SHAW, Esq.



LIBRARY.

The following additions have been made to the Library since the Meeting held in January last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,
presented by the respective Societies or Editors.

Berlin. Die Königliche Preussische Akademie der Wissenschaften,—
Monatsbericht, September and October, 1877.

G. Kirchhoff.—Zur Theorie der Bewegung der Elektrizität in unterseeischen oder unterirdischen Telegraphendrähten.

Calcutta. The National Magazine,—Vol. 2, P. 4.

• ———. The Mahabharat,—No. 17.

———. The Rig Veda Sanhita,—Vol. 1, No. 5.

———. The Geological Survey of India,—Records, Vol. X, Pt. 4.

. *V. Ball.*—On the Geology of the Mahanadi Basin, and its vicinity. On the Diamonds, Gold and Lead Ores, of the Sambalpur District. *Dr. O. Feistmantel.*—Note on “Eryon Comp. Barrovensis,” McCoy, from the Sripematur group near Madras. Notes on Fossil Floras in India.

———. ———. Memoirs,—Palæontologia Indica, Ser. XI. 2.

. *Dr. O. Feistmantel.*—Flora of the Jabalpur Group (Upper Gondwanas) in the south Narbada Region.

London. The Athenæum,—Nos. 2616—2620, 1877.

———. The Geographical Magazine,—Vol. 6, No. 12, 1877.

C. R. Markham.—Irrigation in Southern India, IV., The Basin of the Krishna. Indian Famines and Sun-spots. *R. B. Shaw.*—Water-partings *versus* Ranges.

———. Nature,—Vol. 17, Nos. 424—427, 1877.

Pisa. La Società Toscana di Scienze Naturali,—Atti. Vol. 3, fas. 1.

Torino. La Reale Accademia delle Scienze,—Atti. Vol. 12, Disp. 1—5, 1876-77.

———. Osservatorio della Regia Università,—Bollettino, Anno 11, 1876.

MISCELLANEOUS PRESENTATIONS.

The Yajur Veda Sanhita, Fas. 29.

HOME DEPARTMENT, GOVERNMENT OF INDIA.

Administration Report on the Jails of Bengal for 1876.—By H. Beverley, M. A.

Report on the Police of the Lower Provinces of the Bengal Presidency for 1876.—By J. Monro, C. S.

Report on Vaccination in the Province of Bengal for 1877.—By Dr. J. F. Beatson.

GOVERNMENT OF BENGAL.

Det Arnamagnæanaske Haandskrift,—No. 28, Codex Runicus.

THE TRUSTEES OF THE ARNAMAGNAAN FUND.

Ninth Annual Report of the United States Geological and Geographical Survey of the Territories for 1875.—By F. V. Hayden.

THE AUTHOR.

PERIODICALS PURCHASED.

Berlin. Journal für die reine und angewandte Mathematik,—Band 84, Heft 3—4.

M. C. Jordan.—Mémoire sur les équations différentielles linéaires à intégrale algébrique. *Prof. A. Cayley.*—On the 16-nodal quartic surface. *Herrn Hamburger.*—Über die Wurzeln der Fundamentalgleichung, die zu einem singulären Punkte einer linearen Differentialgleichung gehört.

Calcutta. The Vedârthayatra, or an attempt to interpret the Vedas,—Pt. 2, No. 6.

———. Stray Feathers, Vol. 5, Nos. 5—6, 1877.

The British Association's Rules for Zoological Nomenclature. *J. A. Gammie.*—Occasional Notes from Sikhim, No. I. *S. B. Fairbank.*—A list of birds collected and observed on the Palani Hills. *V. Ball.*—Notes on birds observed in the Region between the Mahanadi and Godavari Rivers. Remarks on the Genus *Iora*. *W. Davison.*—Notes on the Nidification of some Burmese birds. *A. O. Hume.*—*Corvus Macrorhynchus*, of Wagler. *W. E. Brooks.*—Ornithological Notes. *A. O. Hume.*—Remarks on the Genus *Micropternus*. *W. T. Blanford.*—Notes on some birds in Mr. Mandelli's collection from Sikhim, Bhutan and Tibet.

———. The Calcutta Review, No. 131, January 1878.

Giessen. Jahresbericht über die Fortschritte der Chemie,—Pt. 2, 1876.

Göttingen. Göttingische Gelehrte Anzeigen,—Stück, 49—51.

———. Nachrichten,—Nos. 25, 26.

Leipzig. Annalen der Physik und Chemie,—Band 2, Heft 3, No. 11, 1877.

E. Edlund.—Über den Zusammenhang der electromagnetischen Rotation mit der unipolaren Induction. *O. E. Meyer.*—Beobachtungen von Adolf Rosencranz über den Einfluss der Temperatur auf die innere Reibung von Flüssigkeiten.

London. The Academy,—Nos. 293—296, 1877-78.

———. The Chemical News,—Vol. 36, Nos. 942—945, 1877.

No. 944. *Dr. A. Downes*, and *T. P. Blunt.*—Note on the Action of Light upon Solution of Oxalic Acid.

London. The Annals and Magazine of Natural History,—Vol. 20, No. 120.

H. J. Carter.—Description of a new Species of *Foraminifera*. (*Rotalia spiculotesta*.) *A. G. Butler.*—Descriptions of new Species of *Heterocera* from Japan. Part I, Sphinges and Bombyces. *Lieut.-Col. H. H. Godwin-Austen.*—Descriptions of supposed new Birds from the Naga Hills and Eastern Assam. *Arthur, Marquis of Tweeddale.*—Descriptions of some new Species of Birds.

———. The Journal of Botany,—Vol. 6, No. 180, 1877.

H. F. Hance.—Two New Species of *Lysimachia*. *J. G. Baker.*—Two Ferns from Japan.

———. The Society of Arts,—Journal, Vol. 26, Nos. 1308 to 1310, 1877, and No. 1311, 1878.

———. The London, Edinburgh and Dublin Philosophical Magazine,—Vol. 4, No. 25, 5th Series, 1877.

Dr. H. Buff.—On the Thermal Conductivity and Diathermancy of Air and Hydrogen. *G. J. Stoney.*—On the Penetration of Heat across Layers of Gas. *R. S. Brough.*—A Theoretical Deduction of the best Resistance of a Telegraph Receiving-instrument.

New Haven. The American Journal of Science and Arts,—Vol. 14, No. 83, 1877.

Paris. Annales de Chimie et de Physique,—Tome 12, 5^{me} Série, Decembre, 1877.

M. Berthelot.—Nouvelles recherches sur les phénomènes chimiques produits par l'électricité de tension.

———. Comptes Rendus,—Tome 85, Nos. 23—27, 1877.

No. 23. *MM. E. Fremy et Feil.*—Sur la production artificielle du corindon, du rubis et différents silicates cristallisés. *M. A. de Caligny.*—Sur divers moyens d'accélérer le service dans les écluses de navigation. *M. P. Jablockhoff.*—Pile dans laquelle l'électrode attaquée est du charbon.

No. 24. *M. G. Govi.*—De la loi d'absorption des radiations à travers les corps, et de son emploi dans l'analyse spectrale quantitative. *M. Dejerine.*—Note sur les lésions du système nerveux dans la paralysie diphthéritique.

No. 26. *M. Ch. Nauden.*—Observations au sujet du cotonnier Bahmié. *M. L. Cailletet.*—De la condensation de l'oxygène et de l'oxyde de carbone. *M. R. Pictet.*—Expériences sur la liquéfaction de l'oxygène. *M. G. Plante.*—Gravure sur verre par l'électricité.

No. 27. *M. Janssen.*—Sur la constitution de la surface solaire et sur la photographie envisagée comme moyen de découvertes en astronomie physique. *M. E. Cailletet.*—Sur la condensation des gaz réputés incoercibles. *M. G. Hayem.*—Sur l'évolution des globules rouges dans le sang des animaux supérieurs (vertébrés vivipares). *M. V. Feltz.*—Expériences démontrant qu'il y a pendant la vie un ferment figuré dans le sang typhoïde humain.

———. Revue des Deux Mondes,—Tome 24, Livraison 4, December 1877, et Tome 25, Livraison 1, Janvier 1878.

———. Journal des Savants,—Décembre 1877.

———. Revue Scientifique,—Nos. 24 to 26, 2^e Série, 1877, and Nos. 27, 28, 2^e Série, 1878.

No. 24. *M. A. Gaudry*.—Les ruminants et leurs parents.

No. 27. *R. Strachey*.—Des causes physiques de la famine dans l'Inde. Le Jardin des Plantes de Paris.

No. 28. Les Origines du Transformism, d'après la philosophie de Ruvarebohni, saisie en 1808. Le Pamir, par. J. B. Paquier.

BOOKS PURCHASED.

Low, C. R. History of the Indian Navy, (1613-1863). 2 Volumes. 8vo., London, 1877.

KIELHORN, F., DR. The Vyákarana-Mahábháshya of Patanjali. Vol. 1, Pt. 1, (2 copies.) 8vo., Bombay, 1878.

OSBORN, R. D., MAJOR. Islam under the Khalifs of Baghdad. 8vo., London, 1878.

Papers on the subject of the Bengal Cyclone and Storm-wave of the 31st October—1st November 1876, and the subsequent Cholera Epidemic. Folio. London, 1877. P. P.

Copy of Correspondence between the Secretary of State for India and the Government of India, on the subject of the famine in Western and Southern India. Folio. London, 1877. P. P.



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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.
FOR MARCH, 1878.

The Monthly General Meeting of the Society was held on Wednesday, the 6th March, at 9 o'clock P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The Minutes of the last meeting were read and confirmed.

The following presentations were announced—

1. From Major-General F. S. Roberts, C. B., V. C., Quarter Master General in India, copies of "Routes in the Bengal Presidency," and "Routes in Asia, Section I," compiled under his directions.

2. From J. W. McCrindle, Esq., M. A., a copy of his work entitled, "Ancient India, as described by Megasthenes and Arrian; being a translation of the fragments of the Indika of Megasthenes collected by Dr. Schwanbeck, and of the first part of the Indika of Arrian."

3. From the Rev. C. H. A. Dall, M. A., "The Nomenclature in Zoology and Botany," by W. H. Dall.

4. From Capt. C. J. F. Forbes, three copies of his pamphlet on the "Affinities of the Dialects of the Chepang and Kusundah Tribes of Nipal with those of the Hill Tribes of Arracan."

The following gentlemen duly proposed and seconded at the last Meeting were elected Ordinary Members—

W. M. Souttar, Esq., C. S.

Surgeon-Major E. J. Gayer.

James Wilson, Esq., C. S.

The Hon'ble Horace Cockerell, C. S.

A. Campbell, Esq.

G. W. Allen, Esq.

H. G. Keene, Esq., C. S.

W. Hoey, Esq., C. S.

Babu Adhar Lal Sen.

The following are candidates for ballot at the next Meeting—

1. F. R. Mallet, Esq., Assistant Superintendent Geological Survey of India, proposed by W. T. Blanford, Esq., seconded by H. B. Medlicott, Esq.

2. Alfred Simson, Esq., Calcutta, proposed by Capt. J. Waterhouse, seconded by Dr. D. D. Cunningham.

The PRESIDENT, in proposing on the part of the Council, a vote of thanks to Sir E. C. Bayley for his long and valuable services to the Society, explained that the reason for this proposition not having been made at the last meeting, was that the Council had hoped Sir E. C. Bayley would be able to retain the chair of the Society until his departure for Europe. It was scarcely necessary, Mr. Blanford said, for him to remind the members of the Asiatic Society of their obligations to their late President. During the period of between 18 and 19 years, since he was elected a member of the Society in 1859, Sir E. C. Bayley had been on the Council for no less than 14 years, he had held the office of President five times, besides being Vice-President for upwards of 3 years, and he has at all times been a most energetic and valuable member of the Society's Council, aiding in its labours, and assisting the other officers with advice, even when absent from Calcutta with the Government. Sir E. C. Bayley's contributions to the Society's publications date back to 1852; since that time notes by him on various numismatical and archæological subjects have frequently appeared in the Journal and Proceedings, and from his extensive knowledge of early Indian history and his readiness to assist all who were studying the ancient coins, sculptures, and traditions of the country, his share in the researches of the Society has been far greater than would be supposed from a list of his published papers. He has also energetically assisted as a member of the Government of India, in utilizing for the purposes of geographical and biological research the various expeditions sent by the Government into neighbouring little known countries in the course of the last few years. The Society are also greatly indebted to Sir E. C. Bayley for the prominent part he has taken in establishing the Indian Museum, of which he has been a Trustee from the commencement, originally on the part of Government, subsequently as President of the Society, but in both capacities he has been an earnest supporter of the interests both of the Society and of science in India, whilst no one has been a warmer advocate of the Society's claims upon the Government, or has contributed more to the recent improvement in the Society's financial position.

He would therefore propose the following resolution for adoption by the meeting—

“Resolved that the Society record their grateful recognition of the eminent services rendered by their late President, the Hon. Sir E. C. Bayley, K. C. S. I., C. I. E., during the long period of his membership of the Society.”

The resolution was carried unanimously.

The **PRESIDENT** also stated that the Council recommended that as a mark of the high sense they felt of the services rendered to the Society by Sir Edward Bayley and General Thuillier, those gentlemen should continue to receive the Journals of the Society free of expense.

The Council further proposed to obtain enlarged permanent photographs of Sir Edward Bayley and General Thuillier, to be placed in the Society's Rooms, and had already taken steps to obtain the negatives for this purpose.

The **PRESIDENT** announced that Mr. D. Waldie had been appointed a Member of Council in place of Mr. R. Lydekker, who had unexpectedly been obliged to proceed to England on leave.

The **SECRETARY** read the names of the following gentlemen, appointed by the Council to serve on the several Committees during the ensuing year—

Sub-Committee of Finance.

Dr. T. R. Lewis.	T. S. Isaac, Esq.
H. B. Medlicott, Esq.	E. Gay, Esq.
Dr. Rájendralála Mitra.	

Library.

Dr. Rájendralála Mitra.	Dr. Mohendralal Sircar.
Colonel J. F. Tennant, R. E.	A. W. Croft, Esq.
Colonel J. T. Walker, C. B., R. E.	C. J. Lyall, Esq.
Dr. D. D. Cunningham.	Dr. W. K. Waller.
Babu Prannath Pandit, M. A.	C. H. Tawney, Esq., M. A.
R. S. Brough, Esq.	The Hon. Whitley Stokes, C. S. I.
H. F. Blanford, Esq.	Lieutenant F. W. Jarrad, R. N.
E. Gay, Esq.	H. H. Locke, Esq.
Dr. O. Feistmantel.	R. Parry, Esq.
John Eliot, Esq., M. A.	D. T. R. Lewis.
A. M. Nash, Esq.	H. B. Medlicott, Esq.
Dr. J. Anderson.	H. Beverley, Esq. C. S.
A. Pedler, Esq.	J. Crawford, Esq., C. S.

Philology.

Dr. Rájendralála Mitra.	Maulvi Kabiruddin Ahmad Sahib.
C. H. Tawney, Esq., M. A.	Babu Dvijendra Nath Thakur.
Major-Genl A. Cunningham, C. S. I.	The Hon. Whitley Stokes, C. S. I.
J. Beames, Esq.	Babu Prannath Pandit, M. A.
F. S. Growse, Esq.	Dr. G. Thibaut.
Rev. K. M. Banerjea, LL. D.	C. J. Lyall, Esq.
Babu Gour Das Bysack.	Babu Pratápa Chandra Ghosha.
Dr. Mohendralal Sircar.	Dr. A. F. R. Hoernle.
Maulvi Abdul Latif Khán Bahádur.	

Natural History.

H. F. Blanford, Esq.

V. Ball, Esq.

H. B. Medlicott, Esq.

Dr. O. Feistmantel.

D. Waldie, Esq.

A. O. Hume, Esq., c. B.

Dr. D. D. Cunningham.

Dr. J. Armstrong.

Dr. G. King.

S. E. Peal, Esq.

W. E. Brooks, Esq., c. E.

Dr. W. Schlich.

Dr. T. R. Lewis.

R. Lydekker, Esq.

Capt. G. F. L. Marshall, R. E.

Dr. J. Anderson.

Lieutenant F. W. Jarrad, R. N.

Dr. D. Brandis.

Physical Science.

Colonel J. T. Walker, c. B., R. E.

H. B. Medlicott, Esq.

H. F. Blanford, Esq.

D. Waldie, Esq.

A. Pedler, Esq.

R. S. Brough, Esq.

Dr. D. D. Cunningham.

Dr. T. R. Lewis.

E. Gay, Esq.

A. Cappel, Esq.

A. W. Croft, Esq.

J. Eliot, Esq., M. D.

T. S. Isaac, Esq., c. E.

Colonel J. F. Tennant, R. E.

Commander A. D. Taylor.

Dr. O. Feistmantel.

R. Lydekker, Esq.

V. Ball, Esq.

Rev. F. Lafont.

The Hon'ble J. O'Kinealy.

A. M. Nash, Esq., M. D.

J. C. Douglas, Esq.

Coins.

Colonel J. F. Tennant, R. E.

Dr. Rájendralála Mitra.

Major-Genl. A. Cunningham, c. S. I.

Colonel F. W. Stubbs, R. A.

Rev. M. A. Sherring.

The SECRETARY read the following extracts from the Proceedings of the Government of India in the Home Department, No. 7/250, dated 9th February 1878.

RESOLUTION.

At the instance of Pundit Radhakrishna, of Lahore, a scheme was sanctioned by a Resolution in the Home Department, dated 3rd November 1868, for the discovery and preservation of the records of ancient Sanscrit literature, at an outlay of Rs. 24,000 per annum. The chief features of the scheme were as follows :

(1.) " To print uniformly all procurable unprinted lists of the Sanscrit manuscripts in Indian libraries, and to send them to the various learned societies of Europe and to individual scholars in Europe and India, with an intimation that the Government will carefully attend to their suggestions as to which of the manuscripts therein mentioned should be examined, purchased or transcribed ;"

(2.) “To institute searches for manuscripts, and to this end to prepare lists of desirable codices, to distribute these lists among scholars and other persons willing to assist in the search, with a request that they will report their discoveries to such officer as may from time to time be appointed by the Government of India, and to depute competent scholars on tours through the several Presidencies and Provinces to examine the manuscripts reported upon, to seek new manuscripts, to purchase manuscripts procurable at reasonable rates, and to have copies made of such manuscripts as are unique or otherwise desirable, but which the possessors refuse to part with ;” and

(3.) “to grant to the Asiatic Society of Bengal an additional allowance for the publication of Sanscrit works hitherto unprinted.”

The statement given in the margin shews the financial result of the scheme, *i. e.*, how the

	Tour expense of competent scholar.	Purchase of manuscripts.	Transcription of manuscripts.	Total.
	Rs.	Rs.	Rs.	Rs.
Bengal,	1,000	1,000	1,200	3,200
Bombay,	1,000	1,000	1,200	3,200
Madras and Mysore, ..	1,000	1,000	1,200	3,200
North-Western Provinces,	500	500	600	1,600
Punjab,	500	500	600	1,600
Oudh,	500	500	600	1,600
Central Provinces,	500	500	600	1,600
Rajputana,	1,000	1,000	1,200	3,200
	6,000	6,000	7,200	19,200
Printing Native catalogues of desirable manuscripts, .....	..	..	..	1,000
Additional grant to Asiatic Society, ....	..	..	..	3,000
Sundries, .....	..	..	..	800
				24,000

Rs. 24,000 sanctioned as the annual expense for carrying it out are distributed.

This Resolution was communicated to the several Local Governments and Administrations with instructions as to how to carry out the scheme.

The instructions were that all procurable unprinted lists of Sanscrit manuscripts in the Native libraries situate within the territories under the respective Local Governments and Administrations should be printed uniformly in octavo in the Nagri character and under the superintendence of a competent editor, such as Babu Rájendralála Mitra in Bengal, Mr. Burnell in Madras, and Dr. Bühler in Bombay.

Competent scholars should, it was said, be sent annually on tours to examine the manuscripts named in the Native catalogues so printed, to seek new manuscripts, to explain to Native scholars at the different

places visited the objects and importance of the mission, to purchase such manuscripts as the possessors were willing to sell at a reasonable rate, and to employ copyists to transcribe codices which were unique, extremely old or otherwise desirable, but which the possessors might refuse to part with. The gentlemen sent on tours were to make reports to their respective Local Governments, and such reports to be transmitted to the Government of India in the Home Department; scholars, both in India and in Europe, to be invited to transmit lists of desiderata; those in Europe to be requested to communicate with the Government of India through the Secretary of State, those in India through the Local Governments. From the suggestions so received general lists of desiderata were to be prepared and circulated annually, and the notice of Local Governments and Administrations would be drawn to entries in the catalogues received from them which seemed to refer to any work in the lists of desiderata.

Quarterly lists* of the manuscripts found during the previous quarter were directed to be submitted in the prescribed form to the Government of India in the Home Department.

Local Governments and Administrations were to use their discretion in purchasing or having copies made of the manuscripts existing within their jurisdiction. Local Governments were however reminded of the desirability of bearing in mind the subjects which European scholars should deem most valuable, and that manuscripts of the Vedas and Vedāngas and of their commentaries, law books, grammars, vocabularies and philosophical treatises should be regarded as of primary importance. When transcripts were made, these should be in the modern Devanāgarī character. Copies of the Sanskrit manuscripts existing in Southern India, if made in the Telugu or other Dravidian character, would be of little use to European Sanscritists and to the large majority of Native scholars.

These instructions have been carried out as follows :

BENGAL.

In Bengal the task of collecting the lists and purchasing and transcribing manuscripts was entrusted to the Asiatic Society of Bengal. Dr. Rājendralāla Mitra, aided by two Pundits or Sanskrit scholars, has been engaged by the Asiatic Society in carrying out the scheme.

He has already published twelve pamphlets containing notices of Sanskrit manuscripts extant in Bengal.

His report dated 15th February 1875, on the operations carried on by him to the close of 1874 for collecting information regarding Sanskrit manuscripts in Native libraries, is very interesting.

* These lists are now annually prepared.

RAJPUTANA.

The Governor-General's Agent at Rajputana has not reported what

From Foreign Department No. 1079 G, dated 22nd May 1876, forwarding for consideration a letter from the Governor-General's Agent at Rajputana. progress had been made in acquiring Sanscrit manuscripts in the Native States under him up to the end of 1875. He simply submitted copy of a memorandum by Dr. G. Bühler, Educational Inspector in the Bombay Presidency, on the catalogue of Sanscrit manuscripts in the library of the Maharajah of Bikaner, compiled by Hurrish Chunder Shastri, which had been bought for Rs. 1,000.

The Governor-General's Agent stated that the materials collected by the Shastri might be sent to Calcutta, where a competent person could be found to abstract and arrange them under supervision. He suggested that Mr. C. Tawney might be willing to receive charge of the documents and to direct their arrangement.

Dr. Bühler stated that he had examined both the library and the Shastri's work, and expressed his opinion that the latter might be used as a basis for a really useful catalogue fit for publication. He observed that the library of the Maharajah contained in all about 1,400 manuscripts. Hurrish Chunder had prepared a large voluminous compilation giving a catalogue with abstract of contents of 1,200 works. He added that to print this compilation would be very expensive and nearly useless. He suggested that a short abstract of it be made in which the books should be arranged under each Shastra in alphabetical order. The Shastri was prevented by death from preparing abstracts of the remaining 200 works.

The Government of Bengal was asked whether they could recommend any one else who would undertake to bring out the work within a reasonable time and on what terms, it being understood that Mr. Tawney was then in Europe.

On 17th August 1876, the Government of Bengal replied that either Dr. Rájendralála Mitra or the Reverend Dr. K. M. Banerjea might be relied on as being competent to perform the work in a thoroughly efficient manner. Dr. Rájendralála Mitra roughly estimated the cost of bringing out the catalogue at about Rs. 5,000. Dr. K. M. Banerjea observed that he could not himself give an opinion as to the amount of remuneration till he saw the materials he had to deal with.

The Governor-General in Council has been pleased to entrust the work to Dr. Rájendralála Mitra.

Dr. Bühler, it appears, was engaged in exploring Sanscrit manuscripts in Jeypur and Ujjain. The Governor-General's Agent does not report the result of the investigations carried on by Dr. Bühler in those places.

No report has yet been received from the Punjab.

The Governor-General in Council expresses his highest satisfaction at what has already been effected, especially by Dr. Rájendralála Mitra in Bengal, by Drs. Bühler and Kielhorn in Bombay, and by Mr. Griffith in the North-Western Provinces. His Excellency in Council regrets that no report has yet been received of what has been done in the Punjab, where there would appear to be an unusually good field for research with such places as Amritsar, Thanesar, to which may be added Rajaor, Kashmir and Jamu. There can be little doubt that valuable results would be gained, and the Government of India trust that His Honor the Lieutenant-Governor will succeed in finding some person at Lahore or elsewhere who is competent and willing to undertake the work.

The general results which have been obtained are, in the opinion of the Government of India, such as to warrant the prosecution of the search, but the reports received from the several Local Governments and Administrations appear to His Excellency in Council to point to the desirability of re-distributing the work ; and in this view the following arrangements have been suggested as appropriate :

- (a) that Rajputana, Central India and the Central Provinces should be attached to the Bombay Circle ;
- (b) that Mysore and Coorg should be attached to the Madras Circle ; and
- (c) that the North-Western Provinces and Oudh should be amalgamated into one circle, and that the work should be entrusted to one officer, or in the event of its being impossible to find such an officer that both the North-Western Provinces and Oudh should be joined to the Bengal Circle, the grant for that circle being proportionately raised.

The Governor-General in Council desires to be furnished with the opinion of the several Local Governments and Administrations as to the suitability of the re-distribution thus proposed, and to suggest that the existing list of Sanscrit manuscripts should be re-examined by some one competent, and asks, with the view of ascertaining how far it may be worth while to acquire by purchase, where possible, or to secure copies of manuscripts known to exist, that steps be taken accordingly.

His Excellency in Council further desires that the Resolution may be circulated as widely as possible, and that Sanscrit scholars may be invited to make suggestions to indicate desiderata for which it may be deemed expedient to make special search.

The SECRETARY reported that the Society had been invited by the Batavian Society of Arts and Sciences to send a representative to be present at the celebration of the first centenary anniversary of that Society to take place on the 24th April next.

The Council regretted that they were unable to send a member of their body to represent the Society, but had expressed their thanks and congratulations.

The PRESIDENT read the following extract from a letter which he had received from Lieutenant F. W. Jarrad, R. N., regarding future deep-sea dredging operations:

“Have you heard officially of the successful issue of the Asiatic Society’s application to Government regarding deep-sea sounding &c. ?

“While I was in England, I drew up a Memorandum on the subject, and after consulting with several of the staff of the ‘Challenger,’ sent to the India Office a complete list of the sounding and dredging gear required, and also pointed out those which could be obtained from the Admiralty. The Hydrographer of the Admiralty had informed me that he would be able to let us have single specimens of most of the special appliances used, so that the Society’s suggestion that these should be obtained to be used as patterns from which others might be made in India, has been carried out.

“Sir Wyville Thomson also kindly showed me all the ‘Challenger’ collection and explained his mode of treating them, as also the best conditions under which good results were to be obtained, and gave me a mass of information on the subject which will be most useful when we start work. He also drew up a memorandum pointing out the sections which in his opinion would be most usefully carried from several points in the Indian Ocean, and the value of such an examination, in detail, as we should be able to carry out. Besides this he has drawn up some instructions for the use of the Naturalist, and has given us the benefit of all the experience he gained during the ‘Challenger’s’ cruise.

“Our vessel is now ordered to be built in Bombay, and I think there will be no further delay. I have just received orders to go to Bombay whenever I think it necessary, to supervise her construction, and I should think we are certain to have her ready for sea by March or April 1879.

“Before that date, will you call a meeting at the Society’s Rooms, of the Natural History Committee, to consider the subject and draw up some definite plan both as regards the work to be done, the order in which it should be done and the method of dealing with the specimens, (that is by whom should they be worked up). I think this is necessary, or perhaps there will be some misunderstanding afterwards. Of course the specimens should be deposited in the Museum at Calcutta, after they have been described. Preliminary papers might be written after every working season, giving a general description of what had been done, for I presume it would take a considerable time to work up thoroughly each season’s specimens.

“I should consider the serial temperature observations my particular work. What a chance we have in the Indian Ocean to work out the question of Ocean circulation; being closed to the north it offers exceptional advantages for the study of this subject, and in it I take the greatest interest.

“I think the views of the Society on the method of carrying on these investigations should be submitted to Government and orders passed on them.”

The SECRETARY announced that Dr. Rájendralála Mitra had prepared an Index to the Sanscrit works named in Rev. S. Beale's Buddhist Tripitaka, and that copies were available for distribution to Members.

DR. BRANDIS exhibited a series of specimens of timbers from different provinces of India, and explained that large collections had been made for the Paris Exhibition, which had been despatched some time ago, and that from the material which had been brought together for that purpose, a number of sets of specimens had been prepared for institutions in England, in America, on the Continent of Europe and in India.

He drew attention to the great variety of trees and shrubs found in India, the number of which he estimated at 4,000 species, one-half of which are trees. Assuming the number of Phanerogamous plants in India to be 12,000, this would give $33\frac{1}{3}$ per cent. of woody to Phanerogamous plants. In Great Britain the indigenous trees and shrubs number 163, on a total of phanerogamous plants of 1784, or 9 per cent. In the northern part of the United States the woody plants form 16 and in Japan 25 per cent. of the entire phanerogamous vegetation. In purely tropical countries, the proportion of woody among phanerogamous plants varies from 50 to 70 per cent.

One half of India is outside the tropics, a large area on the Himalaya belongs to the temperate zone, and besides this there are extensive forests which consist of one or a few species of gregarious trees; for instance the forests of Sal (*Shorea robusta*), the extensive and nearly useless forests of Sáli (*Boswellia thurifera*) on the trap hills of the Satpura range, the forests of Anjun (*Hardwickia binata*) which are common on certain classes of soil in many parts of the Dekkan and Central India, the Babool (*Acacia arabica*) forests of Sind and the Dekkan, the *Prosopis* forests on the high ground between the Punjab rivers, and the *Dipterocarpus* forests of Burma. All these gregarious forests contribute to reduce the proportion of species among trees and shrubs in the tropical and sub-tropical parts of India.

Nevertheless, even with only 33 per cent. of woody plants, the variety of trees is very great, many are not yet known even to botanists, and it is remarkable how small the number of trees is, the timber of which is an article of trade in and beyond India, and of general consumption. The number of these scarcely exceeds one hundred.

The useful timbers of India may be arranged in three great classes. The first class comprises those timbers which are durable, which season well, which are strong and handsome, and yet are not too heavy or too hard. To these belong Teak, Sisú, Blackwood, Deodar, Padouk, and others. It will be readily understood that the woods of this class are the most valuable. It is not likely that any important additions will be made to the woods of this class.

To the second class belong Sál, Súdri, Pynkadoe, Kusum, the Oaks, and many others. These woods are mostly durable, many of them are very handsome, but they are all exceedingly hard and heavy, they are difficult to work and their carriage is expensive. The number of the woods which may be placed under this class is very large, and if there were a demand for them, their number might be increased indefinitely, but there is no demand and it is not likely to spring up.

The third class consists of light woods, which are not hard and are easy to work. They are not as a rule durable, or strong, but many of them are handsome and useful furniture woods. Toon (*Cedrela Tbona*) Gambhar (*Gmelina arborea*), Mulberry, Walnut are representatives of this class which is capable of indefinite extension. A Burmese wood, Thitka (*Pentace burmanica*), now a regular article of trade, was unknown before 1860. A number of woods of this class have of late years come into notice as useful for tea-boxes, and many valuable furniture woods may be added to it.

Besides these three chief classes, there are woods valuable for special purposes, such as Sandal, Box-wood and Ebony. The Indian supply of Box-wood is small, and much attention has been paid to the discovery of a substitute. Some species of *Gardenia*, particularly *Gardenia latifolia*, may perhaps eventually take the place of Box-wood, but none has as yet been taken up by the trade.

Some remarks regarding the structure of timbers, closed the communication.

The PRESIDENT said that the Members of the Society present at the Meeting were greatly indebted to Dr. Brandis for the opportunity he had afforded them of seeing the superb collection of specimens illustrative of the various kinds of wood obtained in Indian forests, and for the interesting remarks they had just heard. Nothing could better illustrate the

importance of the Forest Department in India, or the wealth of the country in natural products.

In the absence of Mr. BLOCHMANN, Capt. WATERHOUSE exhibited a Persian MS. and read the following note by Mr. Blochmann regarding it.

“The MS. contains the poetical works of a Dihlí poet of the name of Mír Qamar-uddin, poetically styled ‘Minnat.’ Warren Hastings conferred on him the title of ‘Poet laureate.’

“Minnat died at Calcutta in 1793 A. D. He left numerous poems and several works on general literature. Among the poems are several well-known odes; one in praise of the Nizám of Haidárabád, for which he received a present of Rs. 5,000; and two odes on Warren Hastings and Mr. Richard Johnson. The MS. exhibited belonged to Amjad Alí, King of Lucknow, whose stamp it bears, and may be some 80 years old. Among the illuminations are two portraits, one of Warren Hastings and the other of Richard Johnson. Although the portraits are not very excellent specimens of native painting, the likeness of Warren Hastings is very good.”

The following papers were read:—

1. *Stray Aryans in Tibet.*—By R. B. SHAW, Esq., C. I. E.
Political Agent.

(Abstract.)

This paper describes a small tribe of Aryan race, which is wedged in among the Tibetan populations of the Upper Indus, presenting to the student of early institutions the interesting sight of pure Aryans isolated in the semi-barbarous stage and practically unaffected by any of the great religions. Their origin is traced back to Dárdistán (the ancient *Bolor*) which they must have left before the mass of the Dárds became Musalmans. Their religion is local-demon worship; their domestic institutions are polyandrous; they are divided into three castes: priests, husbandmen, and artisans; and they preserve themselves strictly from intermarriage with the neighbouring races. They carry to an excess the Dárd peculiarity of abhorrence of the cow, so unlike the feelings of their Hindu brethren.

The paper will be published in Part I of the Journal.

The PRESIDENT said that the paper just read raised several points of extreme interest; one, with which he had been especially struck, was the extraordinary disproportion of the sexes in this curious tribe, and it was difficult to understand why there should be so much fewer women than men. It would be very desirable to ascertain some statistics of the births, and as the people appeared willing to communicate particulars concerning themselves, this might possibly be ascertained.

2. *Remarks regarding the Hæmatozoa found in the Stomach of Culex Mosquito.*—By T. R. LEWIS, M. B.

The paragraphs which have latterly appeared in Indian newspapers to the effect that it had been definitely ascertained that the cause of 'Elephantiasis' is communicated to man by means of the Mosquito have been very generally commented upon, and it has been suggested to me that a few words as to what is definitely known of the circumstances upon which the statement is based might prove of interest to the Society. Indirectly I am perhaps to some extent responsible for there having been grounds for such a view being advanced at all, as some five years ago, I drew attention to the circumstance that the blood of persons suffering from certain classes of disease in this country was infected by numerous minute nematoid parasites, each about one-hundredth of an inch in length and about the width of a red blood-corpuscle; and that all that was necessary for the demonstration of their existence in the circulation of persons so affected was to prick any part of the body with a needle, and to transfer the drop of blood thus obtained to the stage of a microscope.

One of the diseases with which these hæmatozoa were found to be associated was a form of Elephantiasis, not, however, necessarily associated with what is known as 'elephant leg', though both forms were frequently combined in the same person—a circumstance which has given rise to some confusion in pathological discussions.*

These parasites, or at least a very closely allied species, have now been detected in the blood of persons in various parts of the world—notably by Dr. Sonsino in Egypt, by Dr. Bancroft in Australia, and by Dr. Patrick Manson in China. Dr. Manson has, moreover, made the extremely interesting discovery that embryo-hæmatozoa may be detected in the stomachs of mosquitoes which have been caught preying on the bodies of persons in whose circulation these parasites exist. I had repeatedly examined, in a cursory fashion, these and other suctorial insects, but had not observed any parasites suggestive of these embryo-hæmatozoa, hence, when, on receipt of a communication from Dr. Manson a couple of months ago, a renewed search was made, I was surprised to find that four out of eight mosquitoes, captured at random in one of the servants' houses, harboured specimens of hæmatozoa to all appearances identical with those found in man in this country. After this, however, several days elapsed before any mosquitoes could be obtained which contained these embryo-nematoids, and the

* As this is purely a matter of professional interest it need not be specially referred to here: the disease in question has been carefully described by Dr. Vandyke Carter, Sir Joseph Fayrer, Dr. Kenneth McLeod and other writers, and has received various designations, *e. g.*, Elephantiasis lymphangiectodes, Nævoid elephantiasis; Lymph-scrotum; Varix lymphaticus, &c.

specimens obtained on the next occasion were devoid of the enveloping sheath, which appears to characterise the kind found in man out here, and apparently, according to Dr. Manson, in China also.

Dr. Spencer Cobbold, F. R. S., the well known helminthologist, has drawn prominent attention to Dr. Manson's observations in a recent number of the 'Lancet' [12th January], and states his conviction that the *Culex* mosquito is the intermediary host of the *Filaria sanguinis-hominis*—the name by which the hæmatozoon affecting man is known—and that residence in this insect is necessary for the completion of the filaria life-cycle; hence the association of the mosquito with elephantoid forms of disease. These circumstances made it therefore a matter of some interest to endeavour to learn whether enquiries of a like kind in India would prove equally conclusive in showing that one of the commonest of tropical and sub-tropical insects acted as a disseminator of blood parasites in man, and steps were taken to ascertain whether it could be shown definitely in this country also that the particular worms in question underwent undoubted developmental changes in the stomach of the mosquito.

On a future occasion I hope to give a detailed account of these observations; but, perhaps, it may be deemed sufficient on the present occasion to give in a few words the general results of the experiments so far as they have been proceeded with. Notes have not been made of all the insects examined, but out of 140 female mosquitoes [as is well known, it is the female and not male which preys on our capillary circulation] regarding the examination of which record has been kept, 20 were found to contain hæmatozoa mixed with the ingesta in the alimentary tube—*i. e.*, equal to about 14 per cent. The method adopted has been to collect groups of insects daily and to set them aside for subsequent observation, a few living specimens of each group being examined at stated intervals. The alimentary canal with its contents was removed from the other tissues and the examinations conducted separately so as to avoid, as far as possible, the risk of confounding any developmental changes which might occur in the blood parasites with other parasites which might also be harboured by the insect, for mosquitoes like other insects occasionally harbour different kinds—three or four, what appear to me to be different varieties, have been met with in the course of these examinations. It is of prime importance in enquiries of this kind to be guarded in concluding that because two or more parasites may be associated they are genetically connected; on the other hand it must not be forgotten that it has often happened that parasites have been classified as distinct which should have been described as different stages in the development of the same animalcule.

When the insect is caught shortly after feeding and the contents of its stomach examined microscopically, the hæmatozoa, if present, will be

observed to manifest very active movements which may possibly continue for several hours on the slide. If the insect be kept for 24 hours before examination it is probable that the movements of the parasites will be more sluggish, and their form probably altered owing to irregular contractions and dilatations of their substance—changes which may also occasionally be observed when embryo-hæmatozoa are preserved on a glass slide, and they may sometimes be kept alive thus, if in suitable media, for two or three days. When the insect is not examined till the third day, the contained parasites will probably manifest marked signs of disintegration—and possibly every indication of life will have disappeared from many of the specimens. After the third or fourth day I have not seen any active specimens of these entozoa in the stomach or in any part of the alimentary canal of the mosquito, those which remain have undergone more or less fatty degeneration, are readily stained with eosin, which, as far as my experience goes, is not the case so long as they are alive and active. After the fourth or fifth day it is very rare that traces of any hæmatozoa-like objects can be detected at all, so that it must be inferred either that they have succumbed to the digestive action of the insect's stomach,* or been disposed of along with the excreta. It will of course be understood that these remarks refer solely to the results of personal observations which have up to the present time been made in India—it is quite possible that a more extended knowledge of the subject may modify the conclusions which at present it seems natural to draw. In the meantime I cannot say as a result of direct observation that the mosquito serves as the intermediary host to the development of the *Filaria sanguinis-hominis* or other nematoid hæmatozoon.

It may further be remarked that it would seem that in this country the mosquito obtains its hæmatozoa in great part from pariah dogs; the blood of fully one-third of which, as I had occasion to point out a few years ago, is infested with microscopic parasites closely resembling those found in man.

[ADDENDUM:—A few days after the Meeting an incident occurred which materially aided in elucidating this matter. It was observed that nearly all the mosquitoes captured in one of the servants' houses contained hæmatozoa, so that the supply of suitable insects in all the stages of their growth became amply sufficient for all requirements. The result of the

* Leuckart mentions that a similar result was observed by Fedschenko to follow the ingestion of dracunculus-embryos in the stomach of the *Cyclops*. The latter is believed to serve as an intermediary host for the development of the Guinea-worm—the embryos, however, gain access to the body of the *Cyclops* by piercing the cuticle. When the embryos are swallowed they are digested.

examinations under these favourable conditions has shown that although the stomach digests a great number of the ingested hæmatozoa, as mentioned above, nevertheless others actually perforate the walls of the insect's stomach, pass out, and then undergo developmental stages in its thoracic and abdominal tissues. Although I cannot say as a result of actual observation that the links connecting the various earlier phases of the development are complete, nevertheless they appear so near to being so that it may, I think, be confidently anticipated that observers in this country will soon be able conclusively to satisfy themselves that, in most particulars at least, Dr. Manson's valuable observations apply to India as well as to China.

With regard, however, to the inference that the mosquito is the particular intermediary host of nematoid hæmatozoa, it cannot be said that even these later observations are sufficiently conclusive to warrant a positive statement being made at present, for, though assuming that of the various parasitic forms which have been seen, several are actually transitional stages in the development of one and the same entozoon, it is to be noted that even the most advanced stage hitherto observed is still a very immature one—no trace of reproductive organs, for example, being distinguishable; and every attempt hitherto made by myself to obtain a more advanced condition has proved unsuccessful. Further observation, however, may overcome or explain this want of success.

It should be added that the blood of one of the five persons who were in the habit of sleeping in the house in which these particular insects were captured, was found to contain hæmatozoa in considerable numbers. T.R.L.]

Dr. McLEOD observed that the subject of Dr. Lewis's paper was one of very deep interest, inasmuch as the diseases attributed to, or associated with the presence of, immature *filariæ* in the blood are very serious, and, if the mosquito is the agent of their dissemination, everybody living in countries infested by mosquitos, is more or less liable to them. The theory of the mosquito being an intermediary agent of the development of *Filaria sanguinis-hominis* has been laid down in very plain and positive terms. It is satisfactory to find that, so far as observations made in India have hitherto gone, instead of undergoing development in the mosquito's stomach, these hæmatozoa undergo digestion. The only weak point which occurred to him in Dr. Lewis's observations was that the animals were kept for observation in more or less artificial conditions, and not allowed access to water, which is alleged to be an important medium of the development of these *filariæ*.

There is no question now that these animals exist in the mature state in the human tissues and in the immature state in human blood. How they gain access to the body originally is unknown. Given the mature

worm in the tissues, there is no difficulty in accounting for the immature progeny in the blood, but whence comes the parent? This remains to be discovered. The subject is still very obscure. It is, for example, by no means certain that hæmatozoa exist or have existed in every case of elephantiasis, or that there is a causal relation between the two phenomena, at any rate as regards the most common form of elephantiasis. Dr. Lewis, who has already done such good original work in this field, will no doubt add much to our information on the subject.

8. *On some Mammals from Tenasserim.*—By W. T. BLANFORD, F. R. S.
(Abstract.)

The animals noticed in the present paper are from two collections, one made by Mr. W. Davison for Mr. Hume, to whom the writer is indebted for a very valuable series of skins, the other made by Mr. Limborg.

The localities, sexes, and, in many cases, the measurements taken on the animal when freshly killed have been carefully recorded. The following mammals, not previously known to occur in British territory, have been added to the Tenasserim fauna, *Gymnura Rafflesi*, the Malayan form of *Martes flavigula* and *Tragulus napu*. It is shewn that the first named, however, differs from the descriptions hitherto given in having non-retractile claws, and this may indicate that the Tenasserim animal is distinct, but it agrees in all other respects so well with the Malayan form, that a difference of this importance is improbable. Some peculiar imbricate scales below the tail are also noticed, and a few details of the animal's habits from Mr. Davison's notes.

Besides the species mentioned full descriptions are given of *Prionodon maculosus* and *Sciurus rufigenis*, already described at the February meeting, and notes are added upon *Tupaia Peguana*, *Sciurus atridorsalis*, *S. Phayrei*, *S. coniceps*, *S. Mouhoti*, shewn to be possibly distinct from *S. Berdmorei*, or if not distinct a very marked variety, not previously recorded from Tenasserim, *S. Barbei*, *Pteromys cineraceus*. A variety of *Rhizomys castaneus*, and *Mus robustulus*.

The paper will be published in Part II of the Journal.

4. *On a Copper-plate Grant from Banda.*—By DR. RÁJENDRALÁLA
MITRA, RÁI BAHÁDUR, C. I. E.

(Abstract.)

The deed of grant was originally inscribed on two copper-plates, one of which is lost. The one remaining comprises the whole of the deed except a few imprecatory verses. It is dated Samvat 1191 = A. D. 1135, and records the grant of "ten ploughs" of land to a Bráhmaṇa by

Madanavarma Deva of the Kálinjer dynasty. The author of the paper, when he noticed the Khajraha Inscription of Dhánga in 1866, calculated the date of Madanavarma to be 1150, but then he had to deal with a name—that of Sallakshnavarma—which stood in the place of the grandfather of Madanavarma, and assigning him an average reign of 16 years, he had to remove the last prince by the same number of years. This name, however, now appears to be an *alias* of Kirtivarma, the real grandfather, and omitting the period assigned to him, the chronology is now established on a sure foundation. As far as is yet discovered, the dynasty comprises fifteen generations, of which the dates of three have been taken from dated inscriptions, and the rest inferred by casting averages.

The paper will be published in the Journal, Part I.

5. *On the representation of Foreigners in the Ajantá Frescoes.*—By DR. RÁJENDRALÁLA MITRA, RÁI BAHÁDUR, C. I. E.

(Abstract.)

After pointing out the history of the enquiries made from time to time into the archæology of the Caves of Ajantá, the author dwells upon six fresco paintings in Cave No. I. One of these, representing a court scene, he points out, shows several figures of ancient Persians. The complexion, the features, the long sugar-loaf hats, and the long coats of these figures are, he thinks, characteristic of the Persians, and could not be attributed to any other nationality of ancient times. In four other plates, there are representations of stout, burly, square-faced people of fair complexion and very peculiar turbans or hats, very like the Kilpaks of the modern Central Asiatics. These can be either Afghans or Bactrians, the author is disposed to take them for the latter. Two peculiarities in the dress of these are specially noticed; one is the use of striped stockings, and the other of patch-work embroidery. The Afghans and the Jews in the present day excel in the art of patch-work embroidery, but the cast of the face is so unlike that of the Jews, that the figure wearing such decorations cannot be assigned to the Hebrew race, and the alternative is therefore left between Afghans and Bactrians. For historical reasons the author doubts their being Scythians. In another plate is noticed the use of a short jacket of flowered muslin, very like the *mirjai* of the modern Indians. Mention is, likewise, made of some figures which have the characteristic thick lips and chubby nose of the Negroes.

The paper will be published in Part I of the Journal.

LIBRARY.

The following additions have been made to the Library since the Meeting held in February last.

TRANSACTIONS, PROCEEDINGS, AND JOURNALS,
presented by their respective Societies or Editors.

Bombay. The Indian Antiquary,—Vol. VII, Part 76, February 1878.

J. F. Fleet.—Sanskrit and old Canarese Inscriptions, Nos. 35 to 37. *A.*

C. Burnell.—Where was the Southern Charitrapura mentioned by Hiwen Thsang? *M. J. Walhouse.*—Archæological Notes, Nos. 17 and 18.

Dalpatráñ Pranjivan Khakar.—History of the Kânphâtâs of Kachh.

Bordeaux. Société de Géographie Commerciale, de Bordeaux,—Bulletin, Nos. 2 and 3, 2nd Series. Janvier and Fevrier, 1878.

Boston. American Oriental Society,—Proceedings 1873, 1874, May and November 1875, and May 1876, November 1876, and May and October 1877.

Nov. 1876 and May and Octr. 1877. *Rev. C. H. Wheeler.*—On the Kurmanji Kurdish. *Prof. John Avery.*—On the influence of the Aryans upon the Aboriginal Speech of India. *Rev. J. Chamberlain.*—On the Telugu Language.

Budapest. Természetráji Füzetek,—Fuzet II, and III, (Aprilis-Junius), 1877 and Fuzet IV, (Oktober-Deczember), 1877.

Calcutta. The Indian Medical Gazette,—Vol. 13, No. 2, February 1878.

———. The Agricultural and Horticultural Society of India,—Journal Vol. 5, Pt. III, 1878.

S. Kurz.—The Banana; a Pomological contribution.

———. Geological Survey of India,—Memoirs, Ser. IV, 2, 1878.

Sir P. de M. G. Egerton.—On some remains of Ganoid Fishes from the Deccan.

L. C. Miall.—On the genus *Ceratodus* with special reference to the Fossil Tucto found at Maledi C. India. *W. T. Blanford.*—On the Stratigraphy and Homotaxis of the Kota-Maledi deposits.

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———. Rigveda Sanhita,—Vol. 1, Pts. 5—6.

Hartford, U. S. The Ninth Annual Session of the American Philological Association, 1877,—Proceedings.

London. The Athenæum,—Nos. 2621—2624, 1878.

———. The Geographical Magazine,—Vol. V, No. 1, January 1878.

R. Cust.—Language-Map of the East Indies. The North-Western Frontier of India. The Ancient Silk-Traders' Route across Central Asia.

London. Nature,—Vol. 17, Nos. 428—432, 1878.

Palermo. La Società degli Spettroscopisti Italiani,—Memorie, Dispensa, 11^a—12^a, 1877.

Dis. 11a. *P. Ferrari*.—Eruzione Solare metallica osservata al Collegio Romano il 7 novembre 1877,—Riassunto delle protuberanze solari e delle macchie osservate alla Specola del Collegio Romano nel luglio 1877. *P. Ferrari e da P. Tacchini*.—Imagini spettroscopiche del bordo solare osservate a Roma e Palermo nell'ottobre 1876.

Dis. 12a. *A. Ricco*.—Alcune eleganti esperienze ottiche. *P. Tacchini e G. De Lisa*.—Macchi solari e facole osservate a Palermo nei mesi di ottobre, novembre e dicembre 1877.

Paris. La Société de Géographie,—Bulletin, Novembre, 1877.

J. Thoulet.—Note sur les projections stéréographiques, avec clichés dans le texte.

Roorkee. Professional Papers, on Indian Engineering,—Vol. 7, No. 27, January 1878.

BOOKS AND PAMPHLETS,

presented by the Authors.

CHAMBERS, FRED. Brief Sketch of the Meteorology of the Bombay Presidency, in 1876. Pamphlet. 1876.

DALL, C. H. A. A Score of Facts touching Health and Tobacco. Pamphlet. Calcutta, 1878.

———. A Thousand Life-Mottoes ; gathered from all ages and all lands. Pamphlet. Calcutta, 1878.

FORBES, C. J. F., CAPTAIN. Affinities of the Dialects of the Chepang and Kusundah Tribes of Nipal with those of the Hill Tribes of Arracan, (3 copies). Pamphlet.

HARACHANDRA TARKARATNA. Upadesa Satakam. Pamphlet.

LOCZY, L. VON. Die Liskovaer Höhle, in Baráthehy (Liptauer Comital). Pamphlet. Budapest, 1878.

MCCRINDLE, J. W. Ancient India, as described by Megasthenes and Arrian ; being a translation of the fragments of the Indika of Megasthenes collected by Dr. Schwanbeck, and of the first part of the Indika of Arrian. 8vo., Calcutta, 1877.

MUIR, J., DR. Miscellaneous Extracts metrically and freely translated or paraphrased from the Mahábhárat, 3rd Series. Pamphlet. Edinburgh, 1877.

THUILLIER, MAJOR-GENERAL. General Report on the Topographical Survey of India, for 1876-77. 4to., Calcutta, 1878.

WOOD-MASON, J. Remarks on the Stridulating apparatus in Scorpions. Pamphlet.

MISCELLANEOUS PRESENTATIONS.

List of the Trees, Shrubs, and Large Climbers found in the Darjeeling District, Bengal. By J. S. Gamble, (2 copies.)

DEPT. OF REVENUE, AGRICULTURE AND COMMERCE, GOVT. OF INDIA.

Report on the Administration of Bengal, 1876-77.

GOVT. OF BENGAL.

Annual Medical Report of the Madras Lying-in-Hospital for 1876-77.

Standing information regarding the Official Administration of the Madras Presidency in each Department. By C. D. Maclean.

GOVT. OF MADRAS.

Report on the Administration of the N. W. Provinces for 1876-77.

GOVT. OF THE N. W. PROVINCES.

Report on the Administration of the Panjab and its Dependencies for 1876-77.

Report on the Sanitary Administration of the Punjab for 1876.

GOVT. OF THE PUNJAB.

Report on the Administration of the Land Revenue Dept. of the Central Provinces for 1876-77.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

DALL, W. H. Nomenclature in Zoology and Botany, Salem, 1877.

THE REV. C. H. DALL.

Routes in the Bengal Presidency. Compiled under the direction of Major-General Fred. S. Roberts, C. B., V. C., by Capt. the Hon'ble Charles Dutton. Revised Edition. 4to., Calcutta, 1877.

Routes in Asia. Section 1 : comprising Routes in Asia Minor, Armenia, Kurdistan, Georgia, Mesopotamia and Arabia. Compiled under the direction of Major-General Fred. S. Roberts, C. B., V. C., by Capt. W. J. Boyes. 8vo., Calcutta, 1877.

MAJOR-GENERAL FRED. S. ROBERTS, C. B., V. C.

PERIODICALS PURCHASED.

Bombay. The Vedârthayatra,—Book 2, Nos. 7 and 8.

Göttingen. Göttingische Gelehrte Anzeigen,—1877, Stücke 3—5, 1878.

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Theodor Benfry.—Einige Worte über der Ursprung der Sprache.

Leipzig. Annalen der Physik und Chemie,—Band II, Heft 4, No. 12, 1877.

Heft. 4, No. 12. *S. V. Wroblewski*.—Ueber die Gesetze, nach welchen die Gase sich in flüssigen, festflüssigen und festen Körpern verbreiten. *L. A. Frossmann*.—Über den galvanischen Leitungswiderstand des Selens. *W. Siemens*.—Über die Abhängigkeit der Electricischen Leitungsfähigkeit des Selens von Wärme und Licht.

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London. The Academy,—Nos. 297—301, January and February, 1878.

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Arthur G. Butler.—Descriptions of New species of *Heterocera*, from Japan. Part II, Noctuites. *D. G. Elliot.*—Description of an apparently New Species of Hornbill from Cochin China, of the Genus *Anthracoceros*. *Elliot.*—Description of a new species of Water-bird from Cochin China belonging to the Genus *Porphyrio*. *J. Wood-Mason.*—Preliminary Notice of a species of *Phasmidæ* apparently possessing all the Structural Arrangements needed both for Aerial and Aquatic Respiration.

London. The Chemical News,—Vol. 37, Nos. 947—950, 1878.

No. 947. Liquefaction and Solidification of Hydrogen.

No. 948. *Sergius Kern.*—On the presence of Hydrogen Peroxide in the Atmosphere.

No. 949. Liquefaction of Nitrogen, Hydrogen, and Atmospheric Air. On the construction of a Room or Series of Rooms free from Germ-Life. *George E. Davis.*—On the Estimation of the Nitrogen Compounds in the Oil of Vitriol of Commerce. *M. G. Govi.*—On the Law of Absorption of Radiations across bodies, and of its application in Quantitative Special Analysis.

———. The Entomologist,—Vol. X, No 175, and Vol. XI, No. 176.

———. The Entomologist's Monthly Magazine,—Vol. 14, Nos. 163, 164.

———. The Journal of Botany,—Journal Vol. 7, No. 181, 1878.

H. F. Hance.—Spicilegia Flora Sinensis: Diagnosis of New and Habitats of Rare or hitherto unrecorded Chinese Plants. *Dr. R. H. C. C. Scheffer.*—Annales du Jardin Botanique de Buitenzorg.

———. The Society of Arts,—Journal, Vol. 26, Nos. 1312—1316, 1878.

No. 1313. *Thomas T. P. Bruce Warren.*—The Manufacture of Indian-rubber, and its Application to Telegraphic purposes.

No. 1315. *William Arnot.*—Technology of the Paper Trade. *Christopher Dresser.*—Art Manufactures of Japan.

No. 1316. *Sir J. Fayrer.*—Destruction of Life by Wild Animals and Venomous Snakes in India.

———. The London, Edinburgh, and Dublin Philosophical Magazine,—Vol. 5, No. 28, 1878.

Oliver J. Lodge.—On a form of Daniel Cell convenient as a Standard of Electromotive Force. *William Thomson.*—On the Thermoelastic, Thermomagnetic, and Pyroelectric Properties of Matter. *H. F. Weber.*—Electromagnetic and Calometric Absolute measurements: the absolute value of Siemens's Unit of Resistance in Electromagnetic measure; the relation between the Current-work and the Heat-Evolution in Stationary Galvanic Currents; and the Absolute Values of some Constant Hydroelectromotive Forces in Electromagnetic Measure. *W. E. Ayrton and John Perry.*—Ice as an Electrolyte. Second communication. *Captain Abney.*—On the destruction of the Undeveloped Photographic Image. *G. Govi.*—On the Law of Absorption of Radiations through bodies and its employment in Quantitative Spectral Analysis (Part I.).

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The Indian Famine. How dealt with in Western India. The Telephone. India and our Colonial Empire.

London. *Mind*,—No. 9, January, 1878.

———. *The Quarterly Journal of Microscopical Science*,—No. 69, January, 1878.

G. F. Dowdeswell.—On Atmospheric Bacteria.

———. *The Quarterly Journal of Science*,—No. 57, January, 1878.

Continuous Railway Breaks,—On Residual Phenomena. The Action of Light upon the coloration of the organic world. On the discovery of Stone Implements in Glacial Drift in North America.

———. *The Numismatic Society*,—Journal, Vol. 17, Pt. 3, No. 67, 1877.

New Haven. *The American Journal of Science and Arts*,—Vol. 14, No. 84, 1877.

Paris. *Annales de Chimie et de Physique*,—Tome 13, 5^{me} Serie, Janvier, 1878.

M. Hétet.—Méthode chimique pour la purification des eaux grasses des condenseurs à surfaces, particulièrement à bord des navires à vapeur. *M. Alfred Ditte*.—Examen de quelques propriétés de l'acide borique.

———. *Comptes Rendus*,—Tome 86, Nos. 1—4, 1878.

No. 1. *M. Berthelot*.—Sur l'acide persulfurique, nouvel acide oxygéné du soufre. *M. Bréguet*.—Note sur quelques modifications apportées au téléphone. *M. Dumas*.—Observations sur la densité probable de l'oxygène liquide. *M. R. Pictet*.—Lettre à M. Dumas, sur la densité de l'oxygène liquide. *M. U. Gayon*.—Sur l'inversion et sur la fermentation alcoolique du sucre de canne par les moisissures. *M. A. Trécul*.—Remarques, à l'occasion de la Communication de M. Gayon, sur l'origine des levûres alcooliques.

No. 2. *P. Secchi*.—Observations des protubérances solaires, pendant le premier semestre de l'année 1877. *M. A. Cornu*.—Étude du spectre solaire ultra-violet. *M. R. Pictet*.—Sur la liquéfaction de l'hydrogène.

———. *Journal des Savants*, —Janvier, 1878.

Barthélemy Saint-Hilaire.—Le Zend-Avesta de Zoroaster.

———. *Revue Scientifique*,—Nos. 29—31, 1878.

No. 29. *M. du Bois-Reymond*.—L'histoire de la civilisation et la science de la nature. *M. Cailletet*.—La liquéfaction des gaz permanents et les expériences.

No. 30. *M. J. Chatin*.—Morphologie générale des organes des sens.

No. 31. *M. Angot*.—Les travaux de A. C. Bécquerel.

Paris. *Revue Critique*,—Nos. 1—5, 1878.

No. 4. *Lane's Dictionnaire arabe-anglais*.

BOOKS PURCHASED.

FALLON, S. W., DR. A New Hindustani-English Dictionary, Part 12.

WHEELER, J. TALBOYS. Early Records of British India: A History of the English Settlements in India, as told in the Government Records, the works of old Travellers, and other contemporary documents, from the earliest period down to the Rise of British Power in India. 8vo., Calcutta, 1878.

WOLLASTON, A. N. The Anwár-I-Suhailí or Lights of Canopus, commonly known as Kalilah and Daninah, being an adaptation by Mullá Husain Bín 'Alí al Wái 'z-al-Káshipí of the Fables of Bídpaí. Translated from the Persian. 8vo., London, 1877.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

FOR APRIL, 1878.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 3rd April, at 9 o'clock P. M.

W. T. BLANFORD, F. R. S., President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced :—

1. From the Home Department, Government of India, a copy of a work entitled, "Corpus Inscriptionum Indicarum, Vol. 1, Inscriptions of Asoka." By General A. Cunningham, C. S. I.

2. From J. Wood-Mason, Esq., the following pamphlets :—

Note on *Mygale Stridulans*. Description of a new species of *Phasmidæ* from India. On a small collection of Orthopterous Insects of the families *Phasmidæ* and *Mantidæ* from Australia and New Britain, with descriptions of four new species. Notes on new and little known *Mantidæ*. On the discovery of Stridulating Apparatus in Scorpions. Preliminary notice of a species of *Phasmidæ* apparently possessing all the Structural Arrangements needed both for Aerial and Aquatic Respiration.

3. From the Author, "Eine Liste von Rajmahali-Wörtern. By T. Aufrecht."

4. From the Hon. Sir Edward Bayley, K. C. S. I., several copies of old Journals of the Asiatic Society, and a Persian MS. entitled "Zafar-namah-i-Alamgírí."

5. From the Government of Bengal "A Statistical Account of Bengal," Vols. VI—XIX. By Dr. W. W. Hunter.

6. From J. Rudd Rainey, Esq., Kúlna, Jessore. A silver coin found in the village of Rámnagar, near Kúlna.

The following gentlemen, duly proposed and seconded at the last Meeting, were elected ordinary Members—

F. R. Mallet, Esq.

Alfred Simson, Esq.

The following are candidates for ballot at the next Meeting—

1. James Copley Moyle, Esq., Barrister at Law, High Court, Calcutta, proposed by W. Swinhoe, Esq., seconded by Capt. J. Waterhouse.

2. The Hon'ble L. S. Jackson, C. S., Judge of the High Court, (for re-election), proposed by Captain J. Waterhouse, seconded by W. T. Blanford, Esq.

3. R. Griffith, Esq., Allahabad, (for re-election), proposed by Captain J. Waterhouse, seconded by A. W. Croft, Esq.

4. P. Donaldson, Esq., Calcutta, proposed by Dr. D. D. Cunningham, seconded by Captain J. Waterhouse.

5. C. J. Sharpe, Esq., Calcutta, proposed by Dr. D. D. Cunningham, seconded by Captain J. Waterhouse.

6. James A. Murray, Esq., Kurrachee Municipality Library and Museum, Frere Hall, Kurrachee, proposed by Captain J. Waterhouse, seconded by H. Blochmann, Esq.

The SECRETARY announced that Mr. H. F. Blanford had compounded for his subscriptions by a payment of Rs. 100.

Mr. BLOCHMANN exhibited five silver coins found at a place called Hau Kadool about 25 miles S. E. of the town of Sittang, received from the Honorary Secretary of the Phayre Museum, Rangoon.

Dr. RÁJENDRALÁLA MITRA, to whom the coins were referred, writes regarding them as follows :

“ I return herewith the five silver coins received from Mr. Hardinge. They belong to the same group which Capt. Latter described as the “ Symbolical Coins of Arracan.” (Journal, A. S. B., Vol. XV, p. 238), and Capt. Fryer as of the Vaisali dynasty of Arracan (Journal, A. S. B., Vol. XLI, p. 203). Captain Fryer's coin, however, has the Śivite emblem of the Bull, whereas the new ones bear the Vaishnavite Conch-shell. The symbols, however, are not very decisive indications of the faith of those who struck them. The Conch-shell is as largely used by the Buddhists as the Vaishnavas, and the most prominent mark on the foot-prints of Buddha is a Conch-shell. The Bull is seen on many old Buddhist coins. Capt. Latter's coins have inscriptions, but those received from Mr. Hardinge have none, and this want prevents me from attributing them to their owners. This much, however, may be unhesita-

tingly said that the coins belong to the mintage of the Arracan kings, and they were all Buddhists. Of the three names given by Fryer the last (c) has been incorrectly read by Bábu Pratápa Chandra Ghosha. It is unmistakeably *Sri Vijaya*, and not *Sri Vikrama*. None of the names, however, occur in Mr. Paton's list of Arracan kings published in the sixteenth volume of the *Researches*.

Mr. BLOCHMANN also read the following extract from a letter from Dr. Mitra announcing the discovery of a new Era :

" I have made a grand discovery, nothing less than a new era—that of Lakshmana Sena. It is still current among the Pandits of Tirhút. My travelling pandit, now at Darbhanga, is collecting information on the subject. It will settle the age of the Senas beyond all cavil, upsetting at the same time Cunningham's date of the Pála kings of Bengal."

Mr. H. F. BLANFORD exhibited two autographic records of recent Nor'-Wester storms which occurred on March 8th and 14th ; the one accompanied by a slight fall of rain, the other without rain. The records consisted of the photographic traces of the barograph, and the dry and wet bulb thermometers ; the direction and movement of the wind, registered by a Beckley's anemograph ; and the trace of Beckley's hyetograph showing the rainfall. As all the traces are continuous they shew all the changes that took place during the storms and afford the means of correlating these with each other.

The two sets of traces agreed in many points. In both the evenly-waved line which marked the diurnal barometric tides, was suddenly interrupted just before the storm by an abrupt rise of pressure. This was followed in both by a rapid veering of the wind from S. S. W. to West in one case, and through West and North to East in the other, and a considerable increase in its velocity ; and in both storms also by an abrupt fall of the wet-bulb thermometer through several degrees (16° in the rainless, and 9° in the rainy storm). But, whereas in the rainy storm the dry-bulb thermometer also fell through 8° , in the rainless storm it rose as abruptly through $4\frac{1}{2}^{\circ}$, this change, be it observed, occurring at 10 P. M. At the temperatures observed these changes in the rainless storm of the 14th March, indicate a fall in the humidity of the air from 83 to 34 per cent., the whole of which was accomplished in half an hour, the greater part indeed within about 10 minutes.

The rise of temperature in a storm which is accompanied by little or no rain, though rare, is not now recorded for the first time. A similar occurrence took place at Calcutta on the 20th May 1870, between 7 and 10 P. M., and was described by Col. Tennant in the Proceedings of the London

Meteorological Society, Vol. V, p. 213. On this latter occasion some rain fell in the earlier part of the storm, and before it had quite cooled was accompanied by a distinctly hot and dry wind, which lasted, however, only for a short time, and was followed, as is usual in Nor'-Westers, by a calm.

Mr. Blanford said that having regard to all the circumstances of these storms, he could not regard the rise of temperature as due to the influx of a hot surface-wind, but considered it more probable that it was a case of dynamic heating. As Mr. Phear had pointed out at a former meeting of the Society, the strong gusty wind of a Nor'-Wester is probably a portion of the upper Westerly current that strikes down to the earth. Such a mass of air in descending must, according to thermo-dynamic laws, develop 1° of temperature for each 183 feet through which it descends. In rainy storms this heat is probably used up in great part in the evaporation of the accompanying rain, but in storms in which little or no rain occurs during the descent, a part of this heat is retained and causes a rise of the thermometer and a great fall in the humidity of the air.

Mr. H. F. BLANFORD also exhibited a series of the charts now drawn up in the Meteorological Office, which show the distribution of pressure and temperature, the wind direction and the rainfall at 10 P. M. daily for the whole of India. The two former elements are shown by blue and red lines which respectively represent the isobars for each twentieth of an inch and the isotherms for each 5° of temperature. The series began with October last, and as yet it would be premature to attempt to generalize on the facts they exhibit, but he drew attention to one or two cases of rainfall during the cold weather months, and contrasted them with the charts exhibited on a former occasion, which had been specially drawn up to show the state of things that accompanied the rainfall of the S. W. monsoon. These latter showed that during the S. W. monsoon, barometric minima or cyclones (not of a violent character) were successively formed either in the N. W. corner of Bengal, or over Orissa and the country to the westward, and, in 1875, moved northward or north-westward, carrying the rain with them to the Gangetic valley and the Central and Upper Provinces. During the season of 1877 they had not followed this latter course, but in many cases had moved towards the north-east, whence the almost entire failure of the rainfall in the N. W. Provinces.

In the cold weather months, again, the state of things was different. There was a constant tendency to a high pressure in the lower Indus valley; but to a frequent recurrence of low-pressure areas in the Punjab, where it appeared that the rain first fell. This fall was followed by a strong cool current from the North-West, and the rainfall area then receded down the Gangetic valley and in some cases reached Lower Bengal.

The following papers were read :—

1. *A Legend regarding the origin of the name Ohháyápati or "Lord of the Shadows," a small Táluq in Pargana Hoglá, Zilá Jessore.—By H. JAMES RAINY.*

To any one acquainted with the vernacular language of Lower Bengal, the designation Chháyápati is sufficiently striking to awaken curiosity regarding its origin, as it signifies "Lord of the Shadow," from *chháyá* (ছায়া), "Shadow," and *pati* (পতি), "Lord." Finding it among the names of one of the minor *táluqs* in my family *zamindaris* situate in *Parganá Hoglá*, I naturally enquired about it, but for some time was unable to obtain any specific information regarding it. At last the following precise account of the derivation was narrated to me by an aged Bráhmaṇ, and, I think, it may be fairly presumed to be substantially correct.

An ancestor of the present owners of the *táluq*, a high caste Bráhmaṇ famed for his piety, became a defaulter of rent of his holding, and the *zamin-dár* being unable to realize it, despatched him with others in a like position, as usual in such cases, to the Court of the Nawáb, then held in Murshidábád. The defaulters being brought before the Nawáb, various punishments, more or less severe, were imposed on them, to compel them, if possible, to discharge the arrears of rent due by them. That allotted to the Bráhmaṇ, was, that his head should be shaved, well smeared with oil, and exposed to the full blaze of the sun. The Nawáb looked calmly on as the unfortunate Bráhmaṇ was placed in the centre of the Court-yard, when, suddenly, a dense cloud passed over the face of the sun, and it was thoroughly obscured, leaving him perfectly in the shade. The reputation acquired by the aged Bráhmaṇ for austere devotion and sanctity being well known to the assembly, the by-standers exclaimed "a miracle ! a miracle !" The Nawáb immediately ordered the release of the Bráhmaṇ, and granted to him his holding at a nominal rental. And, in order to commemorate what he deemed to be nothing less than a miraculous event, he changed the name of the tenure to *Chháyá-pati*, which it has retained ever since. The former name of the place is not known.

The event here related is said to have occurred some time before the British assumed the Government of the country, about a century and a half ago.

2. *An Account of the Tidal Observations in the Gulf of Cutch conducted by the Great Trigonometrical Survey under the superintendence of COLONEL J. T. WALKER, C. B., R. E., during the years 1873-74-75. Compiled from the G. T. Survey Reports by CAPTAIN J. WATERHOUSE, Assistant Surveyor General.*

(Abstract.)

This paper contains an account of the operations connected with, and the final results of, the first series of Tidal observations made, in seasons 1873-74 and 1874-75, by a party of the Great Trigonometrical Survey under Capt. A. W. Baird, R. E., with the primary object of determining the existing relations between the level of the land and the sea at certain points on the coasts of the Gulf of Cutch, as a first step towards investigating the question whether progressive changes are taking place in the level of the land at the head of the Gulf, as has long been supposed to be the case.

The paper will be published in full in the Journal, Part II.

COLONEL WALKER observed that the reduction of tidal observations is a very laborious matter, but that when once the values of the two constants—the amplitude and the epoch—have been determined for each of the several hypothetical tides and their sub-tides, the varying height of the surface of the ocean, from hour to hour and from day to day, may be graphically represented, with great facility and rapidity, by an instrument recently invented by Sir William Thomson, which is at present in the collection of scientific instruments at South Kensington.

He showed that any one of the constituent tides might be graphically represented by the action on a rotating cylinder—such as the barrel of an ordinary self-registering instrument—of a pencil connected with a point in the circumference of a revolving wheel. When the wheel is suspended vertically and the pencil is held in a vertical groove, so as to be free to move up and down against the barrel, the pencil is made by its connection with the point on the wheel to travel backwards and forwards through a distance equal to the diameter of the wheel, and it thus describes, on the surface of the rotating barrel, a curve of which the ordinates are equal to the height of the point above the centre of the wheel at any moment, while the *abscissæ* denote the times corresponding to the heights. Just as a single tide can thus be graphically delineated, so may the resultant of a large number of tides be represented. In Sir Wm. Thomson's machine, as many wheels as there are tides are constructed, the radius of each wheel being made to correspond with the amplitude of the tide it has to represent; the wheels are centered to a vertical frame, half of them above and the other half below an axle by which each wheel is driven and caused to revolve on its axis with a velocity corresponding to that of its tide. To the circumference of each wheel a stud is attached at a point corresponding to the epoch of the tide. A silken thread is fastened to the stud of the wheel most distant from the pencil in the upper row, it is then brought down and passed round the stud of the wheel immediately below, then carried up to and over that of the next wheel above, and so on until, eventually, after having been passed round

the stud of each wheel in succession, it is fastened to the recording pencil. The curve traced by the pencil now represents the aggregate result of all the component tides corresponding to the several wheels, that is to say, it represents the momentarily varying level of the surface of the ocean at the station where the observations were taken. Though the ordinary motion of the pencil is up and down, there is an arrangement by which the pencil is slightly jerked to one side after a certain number of revolutions of the driving axle; this is done to mark the successive hours on the curves. At spring tides the range between high and low water is considerable and the hour-marks are far apart; while at neap tides the range is much less and the hour-marks are correspondingly closer.

One of the great advantages of this instrument is that with its aid the sea-surface curves for an entire year can be drawn in about three hours; while a skilful computer would probably take a month to obtain the same results by calculation. A new instrument of this kind is now being constructed in England with all Sir William Thomson's latest improvements, for the use of the Survey Department, and it will be of great value and assistance in the preparation of Tidal Tables for the several Indian ports, a duty which the Government have lately imposed on that Department.

Mr. H. F. BLANFORD asked Colonel Walker whether the discussion of the barometric and anemometric data in conjunction with those of the tidal registers of the Gulf of Cutch would throw any light on the respective influence of pressure and wind-friction in piling up the surface of the ocean. The storm wave that accompanies cyclones is an instance of the combined action of these two agents, and it would be interesting to know in what measure they were severally effective.

COLONEL WALKER replied that at one of the tidal stations, Hanstal, the changes of wind and pressure were so nearly synchronous that it was impossible to separate the effect of the wind from that of the pressure. At another station, Okha, very fairly reliable measures of the same effect of each were obtained. They are given at the end of the analysis of the observations.

3. *Recent Trans-Frontier Explorations.* Communicated by COLONEL J. T. WALKER, C. B., R. E., *Surveyor General of India.*

(Abstract.)

This communication consists of an extract from the last Annual Report of the Great Trigonometrical Survey, giving an account of the explorations made by one of the G. T. Survey explorers, called the 'Mullah,' during the year 1876, up the course of the Indus from the point where it enters the plains above Attock to the point where it is joined by the river of Gilgit, which had up to the present time remained a blank on the maps.

The paper will be published, with map, in the Journal, Part I.

After reading the account of these explorations, Col. WALKER remarked that wherever the Mullah struck on routes which had been surveyed by the lamented Lieut. Hayward there was a very satisfactory accordance between the results of the two explorers, which was the more satisfactory in that they were obtained quite independently. He also stated that very remarkable testimony to the accuracy of Lieut. Hayward's work had been afforded by the circumstance that several peaks on an important range of hills between the Karambar and the Nagar valleys to the North-West and North of Gilgit, of which the positions had been determined by Lieut. Hayward, have recently been found to have been fixed by the operations of the Trigonometrical Survey, without his knowledge; and the accordance between the Trigonometrical results and his is sufficiently close to show how careful and accurate that portion of his work must have been.

Dr. CAYLEY said—When stationed in Tibet I often heard the native merchants, especially those from Swat and Bajaur, describe their route through Bajaur and then by Wakhan and the Pamir to Yárkand. This was indeed a regular well-known trade route, though the country was but little known to us, and until the recent explorations just described, only very roughly marked in our maps.

I frequently met Hayward during his travels in Tibet, and was always much struck with his untiring energy and enthusiasm and his little regard for his personal safety and comfort when surveying and exploring.

I met him in Kashmir just after his return from his first visit to Yasin, and it is very gratifying to know that the observations that he took and the survey operations he carried on under such great difficulties and when so jealously watched, were so carefully and accurately done, as confirmed by the recent observations of Col. Walker's native surveyor.

4. *Sixth List of Birds from the N. E. Frontier of India.*—By LIEUT.-COLONEL H. H. GODWIN-AUSTEN.

(Abstract.)

This paper contains a list of birds collected in the Eastern Nágá Hills by Mr. A. W. Chennell, and in the low hills near Sadiya and the neighbourhood of the Brahmakhúnd by Mr. W. T. Ogle, during the progress of the Topographical Survey for two seasons.

One new species, *Abrornis flavogularis*, is thus described.

Above, ash-grey, purer grey on rump, rather darker on the head; wings pale umber-brown, tail ash-brown, the two outer feathers white on the inner web, the next with a narrow edging of white. Lores white, ear coverts white and grey; chin pure yellow, fading on throat; breast, nape, flanks and thighs, greyish white, whitest on the breast; a very faint yellow

tinge on the albinism. Under the nostrils white, a small patch of yellow on inner margin of the wing. All dark above, buff below. W. 1.54 inches: T. 1.5. L. 1.45: H. 1.3.

Habitus: Similar to *cygna*. This species is nearest to *A. maculosa schistosa*, having the same configuration of the head and form of the bill, it is distinguished from all other species by its entirely silky upper surface.

The paper will be published in the Journal, Part II, with 2 plates representing *Garrulus maculosa* G. A. and *Macropygia cygna* G. A.

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The following additions have been made to the Library since the Meeting held in March last.

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Dublin. The Royal Geological Society of Ireland,—Journal, Vol. 4, Nos. 3, 4, 1875-76 and 1876-77.

The paper will be published, with map, in the Journal, Part I.

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One new species, *Abrornis flavogularis*, is thus described.

Above, ash-grey, purer grey on rump, rather darker on the head; wings pale umber-brown, tail ash-brown, the two outer feathers white on the inner web, the next with a narrow edging of white. Lores white, ear coverts white and grey; chin pure yellow, fading on throat; breast, nape, flanks and thighs, greyish white, whitest on the breast; a very faint yellow

tinge on the abdomen ; under tail coverts white ; a small patch of yellow on inner shoulder of the wing. Bill dark above, buff below. W. 1·84 inches ; T. 1·8 ; t. 0·67 ; Bf. 0·3.

Habitat ; Sadiya, (Mr. Ogle). This species is nearest to *A. xanthoschistus*, having the same colouration of the head and form of the bill, it is distinguished from all other species by its entirely ashy upper surface.

The paper will be published in the Journal, Part II, with 2 plates representing *Garrulax nuchalis*, G.-A. and *Actinura Oglei*, G.-A.

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ELLIOT, SIR H. M. The History of India, as told by its own Historians. The Muhammad Period. Edited and continued by Prof. J. Dawson. Vol. 8. Rl. 8vo., London, 1877.

KINLOCH, ALEXANDER, A. A. Large Game Shooting in Thibet and the North West, Part II. 4to., London, 1876.

RICHTHOFEN, FERDINAND, FREIHERR VON. China. Ergebnisse eigener Reisen und darauf gegründeter Studien, Vol. 1. 4to., Berlin, 1877.

SCHLIEMANN, DR. HENRY. Mycenæ, a Narrative of Researches and Discoveries at Mycenæ and Tiryns, with preface by the Right Hon. W. E. Gladstone, M. P. 8vo., London, 1878.

WIGHT, ROBERT. Icones Plantarum Indiæ Orientalis, or Figures of Indian Plants. Vols. 1—6, Rl. 4to., Madras, 1840.

FALLON, S. W. DR. A new Hindustani-English Dictionary, Pt. 12.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

FOR MAY, 1878.

The Monthly General Meeting of the Society was held on Wednesday the 1st May at 9¼ o'clock P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The following presentations were announced—

1. From the Russian Geographical Society, back numbers of their publications, and other books, including a copy of "Reisen in Süden von Ost-Sibirien in den Jahren 1855-1859", by Gustav Radde.

2. From the British Museum, a copy of "The Gigantic Land Tortoises (living and extinct) in the collection of the British Museum," by A. C. L. G. Gunther.

3. From Lieut. R. C. Temple, 21st R. N. B. Fusiliers, a copy of the "Transliteration of the Burmese Alphabet into Roman characters, and a note on the Vocal and Consonantal Sounds of the Peguan language." Also "The Lord's Prayer in the South Andaman language."

The following gentlemen, duly proposed and seconded at the last meeting, were elected Ordinary Members—

1. James Copley Moyle, Esq.
2. The Hon'ble L. S. Jackson (re-elected).
3. R. Griffith, Esq. (re-elected).
4. P. Donaldson, Esq.
5. C. J. Sharpe, Esq.
6. James A. Murray, Esq.

The following are candidates for ballot at the next meeting—

Charles Steuart Bayley, Esq., C. S., proposed by W. T. Blanford, Esq., seconded by Capt. J. Waterhouse.

Lieutenant R. C. Temple, 21st R. N. B. Fusiliers, Dharmasala, proposed by Capt. J. Waterhouse, seconded by H. Blochmann, Esq.

The SECRETARY announced to the Meeting that news had been received of the death of Dr. P. Bleeker, Corresponding Member of the Society.

Also that Mr. G. S. Leonard, the Assistant Secretary, had resigned his appointment, and that the Council had nominated Mr. W. E. Bateman to the vacant post on trial.

The SECRETARY read the following letter from Mr. J. O'Kinealy, Offg. Secretary, Government of India, Home Department, in reply to a communication of the Council on the subject of the Indian Treasure Trove Act, VI of 1878.

No. $\frac{18}{761-71}$.

From

JAMES O'KINEALY, Esq.,
Offg. Secretary to the Govt. of India.

To

The Secretary to the Governments of Madras, Bombay, Bengal, N. W. Provinces, Oudh, and the Punjab.

The Chief Commissioners, Central Provinces, British Burma, Mysore, Coorg, and Assam.

The Resident at Hyderabad, and the Superintendent of Port Blair and the Nicobars.

Fort William, the 3rd April, 1878.

SIR,

With reference to the Indian Treasure Trove Act, VI of 1878, I am directed to request that the necessary orders may be issued to Collectors that, unless there is some strong reason to the contrary, whenever two or more coins of the same kind are found, the Asiatic Society, Calcutta, may be allowed the option to purchase one of them; and that in all cases in which notice may be received of coins having been found, the Collectors should communicate the information to the Asiatic Society.

I have &c.,

JAMES O'KINEALY,
Offg. Secretary to the Govt. of India.

No. 772.

Copy forwarded to the Honorary Secretary, Asiatic Society of Bengal, with reference to his letter No. 113, dated the 15th ultimo.

J. O'KINEALY,
Offg. Secretary to the Govt. of India.

CAPT. WATERHOUSE exhibited a photograph of part of the sun's disc, obtained by M. Janssen at the Observatory of Meudon, near Paris. He said: The photograph I have the pleasure of exhibiting is one published in the *Annuaire du Bureau des Longitudes*, Paris, for 1878, and represents a small portion of the solar disc enlarged from one of M. Janssen's negatives taken on the 10th October 1877, at 9h. 36m. On M. Janssen's negative the diameter of the sun's disc was 305 mm., or about 12 inches, and it has been enlarged three times, consequently the full diameter of the disc as represented in part in the photograph is 0m.92, or about 36½ inches.

The photograph is accompanied by an explanatory note by M. Janssen, in which he lays down the principles that have guided him in making these photographs, and the following is a brief abstract of it.

Up to the present time photography, considered as a means of describing the surface of the sun, has remained much inferior to eye observations with large instruments.

Photographs on which the sun's image is not more than 4 or 5 inches in diameter cannot show the structure of the photosphere, but this is indispensable towards making any progress in solar knowledge.

The study of the solar spots, which for the last two centuries and a half has furnished almost the only data on the constitution of the photosphere, seems now almost worked out, or, at least, it ought to be supplemented henceforth by the study of the photosphere itself.

The study of the photosphere by eye observations is attended with great difficulties, the chief of which is the impossibility of clearly recognising the form of the granulations in the midst of the flaming photosphere, or to measure them and, still less, to identify them in order to follow their changes.

Consequently it would be an immense advance in solar knowledge if photography could give us images of the sun's surface, showing the details sufficiently clearly to permit this study; it would also be a foundation of future progress and discoveries.

The solution of this problem has occupied M. Janssen from the time that he commenced these solar photographic observations.

On considering the conditions under which solar photographs had hitherto been taken, M. Janssen found that the principal cause which prevented the details of the solar surface from appearing on the photographs was photographic irradiation, by which the images of bright objects are enlarged; and it is therefore evident that if the details of the granulation of the solar surface are smaller than the amount of this irradiation, it will be impossible to obtain them with any sharpness.

M. Janssen considered that the solution of the difficulty was in enlarging the image, combined with a diminution in the time of exposure.

There is thus a triple chance of success. First, because the irradiation diminishes rapidly with the increase in diameter of the images, especially if the exposure is lessened at the same time ; secondly, because the dimensions of the details are enlarged, and therefore the details ought to be more easily obtained ; finally, the defects of the sensitive surface are of less relative importance.

There is another circumstance which, in this case, is particularly favourable for obtaining very well defined images. In short exposures, the photographic spectrum is reduced to a very narrow band and the rays which act belong to a little group almost monochromatic.

The optical spectrum is on the contrary very extended, and therefore photography may be expected to yield much better defined images than can be obtained by eye observation.

It is true that the photographic difficulties increase with the size of the image, but these difficulties can be overcome by care and perseverance.

M. Janssen has, therefore, since the commencement of these studies in 1874, constantly endeavoured to obtain the solar images larger and larger, advancing from between 4 and 5 to 12 inches in diameter.

At the same time as the dimensions were increased, the composition of the sensitive surface and the mode of development were improved. The development of the image ought to be very gradual, commencing with iron and finishing with pyrogallic acid and silver.

The greatest care must be taken in the focussing and in giving an even exposure all over the plate.

The length of exposure is very short. In summer it is between $\frac{1}{1000}$ and $\frac{1}{3000}$ of a second for the images of 12 inches diameter.

In consequence of the very short exposure the development is slow, but then the image appears in all its details, free from irradiation, and shows the phenomena we have now to consider.

The photographs show the solar surface covered with a fine general granulation, the form, dimensions and arrangement of the granular elements being very variable. In size they vary from some tenths of a second to 3 or 4 seconds. The forms are circular or more or less elongated ellipses, but often these regular forms are altered.

The granulation is visible everywhere and does not seem to possess a different composition towards the poles of the sun. The luminous power of the granular elements considered separately is very variable. They appear to be situated at different depths in the photospheric layer.

The most luminous granulations only occupy a small portion of the surface of the sun.

But the most remarkable result, and which is due entirely to the aid of photography, is the discovery of the photographic net-work.

In fact, an attentive examination of these photographs shows that the photosphere is not of uniform constitution all over, but that it is divided into a series of figures more or less distant one from the other, and showing a distinct constitution. The outlines of these figures are generally rounded, but often nearly rectilinear and resembling polygons.

The dimensions of the figures are very variable. They sometimes attain a diameter of one minute or more. Whilst in the intervals between the figures, the grains are distinct and well-defined, although of variable size, in the interior, they are half-effaced, drawn out and confused; generally they have disappeared to give place to streams of matter which replace the granulation. Every thing indicates that in these spaces, the photospheric matter is undergoing violent movements which have confused the granular elements.

Another very important fact, shewn in a very certain manner by the photographs, is, that numerous very dark points show themselves in the parts where the granulation is regular, and indicate that the photospheric layer must have a very slight thickness.

Capt. Waterhouse remarked that some of the small photographs that were now being taken at the Surveyor-General's Office with the photo-heliograph, frequently showed a mottling and figures of various shapes that appeared to correspond with what M. Janssen called the photographic net-work. These photographs were taken by Capt. Abney's beer-albumen process, with alkaline development. Some photographs taken by Colonel Tennant with the same instrument after the Transit of Venus showed these figures very clearly indeed; they were taken by the ordinary wet-collodion process, but were very carefully exposed and developed with pyrogallic acid instead of iron.

These photographs, on which the disc of the sun is only four inches, are too small, and the definition of the instrument is not sufficiently good, to permit of the details being enlarged, so as to make useful observations of the daily state of the photosphere as M. Janssen was doing. For this purpose, a much more powerful optical arrangement was necessary.

The Rev. FR. LAFONT asked to what the distinct difference existing between the various parts of the photograph exhibited was due, some parts being very sharp in outline, others very ill-defined, as if out of focus. It could not be that the tops of the flames in the chromosphere are sufficiently distant from it to produce a difference of focus; might it be that even in the short duration of the exposure, these flames or some of them, displace themselves enough to destroy the sharpness of their outlines? or is it due to some vibration of our own atmosphere? He could hardly believe that the movement of the protuberances is such as to sensibly displace them upon the sensitive plate in the $\frac{1}{3000}$ of a second.

CAPT. WATERHOUSE replied that the want of sharpness was not particularly referred to by M. Janssen in his note, unless it was part of the very phenomenon described by him as occurring in the intervals between the figures of the photographic net-work. He had seen it stated in some of the English journals, that the want of sharpness was not due to any defect of focus or photographing, but was actually the representation of solar phenomena.

Capt. WATERHOUSE said that his attention had been drawn by General Gowan to a photograph of a sculptured group in the Garalmandal Temple at Pathári, near Saugor, in Central India, taken by himself in the year 1862, with reference to a translation by Miss Tweedie of a paper by Prof. Weber, on the Kṛishṇa-janmáshṭami or Kṛishṇa's birth-festival, published in the 'Indian Antiquary' for December 1877.

The piece of sculpture, of which he exhibited a photograph to the meeting, represented a female figure nearly the size of life lying down on a couch, with the left hand partly supporting her head and a little child lying by her side. Behind the couch there are five smaller female figures, standing apparently in attendance. Some of these hold *chauris* and one holds a sort of bag or purse. The couch is covered with a flowered cloth, and has embroidered cushions. It is supported on carved legs by two couchant lions and a seated human figure. The face and other parts of the principal figure have unfortunately been very much damaged.

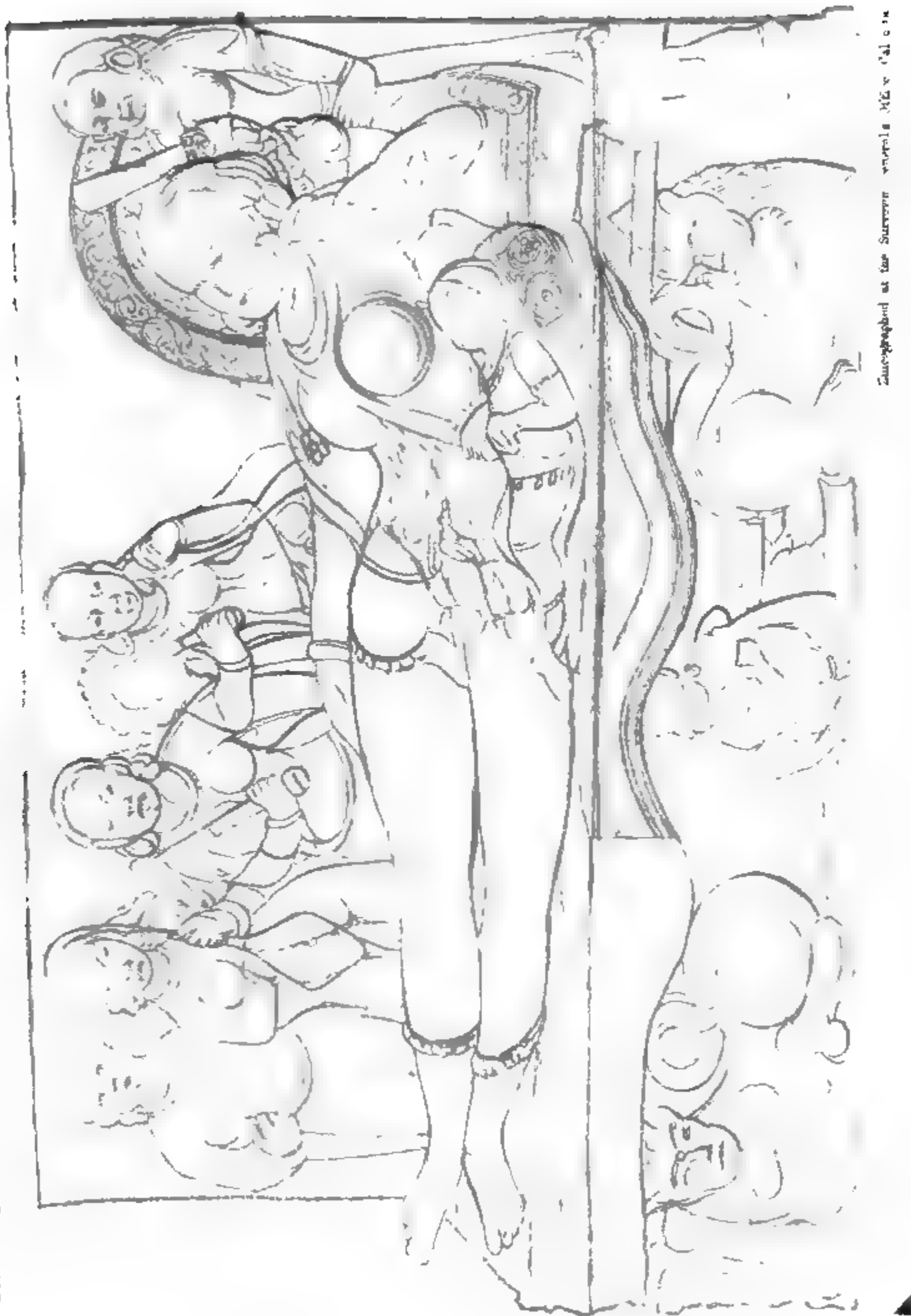
From the nimbus round the head of the recumbent female figure, she is evidently a person of sanctity, but whether the sculpture is intended to represent Devakí with the infant Kṛishṇa, or Máyá with the infant Buddha, it was difficult for him to say, though he had always taken it to be the latter. Capt. J. D. Cunningham, who described the ruins of Pathári in the Society's Journal, No. 189, for April 1848, says, that tradition declares the figure to be that of the Garerun who built the temple, and adds that the shepherd missing his wife one day, was told that her heart's desire had been accomplished; a copious spring had overflowed and formed a lake close to her temple, and that she herself having done with the world, had been metamorphosed into stone, and had become the guardian of the fane of her own erection.

The only point of interest in the sculpture, is the beauty and artistic grace it possesses, and the fact that the child is represented as lying quietly by the side of its mother, with its hands up, while in most of the instances quoted by Prof. Weber in the paper referred to by General Gowan, the infant Kṛishṇa is represented as at the breast of his mother.

Capt. Waterhouse said, he was not competent to offer an opinion on the subject himself, but General Gowan had thought it might be of interest

PLATE III.

Proceedings, Asiat. Soc. Bengal, 1878.



Engraved at the Surveyor General's Office, Calcutta.

— THE — IN — OF — IN —

to the Society. An outline sketch would be published in the Proceedings, (see Plate III). Unfortunately the original negative from which the photograph was printed, was in England, and many details are wanting in the only copy that remained, owing to the fact that half the sculpture was in very strong shadow inside the temple.

ADDENDUM ;—Since the meeting I have shown the sketch to Dr. Rájendralála Mitra who has kindly favoured me with the following information.
J. W.

“ According to the Harivaṅśa and other leading Hindu authorities Kṛishṇa was born when his parents were in prison. The birth took place in a dark rainy night when the warders had fallen asleep, and the father, to save his new-born babe from the doom which awaited it at the hands of Rájá Kaṅśa, the Indian Herod, secretly carried it away, crossed the Yamuná on foot, and finding Yasodá, a cowherdess, asleep by the side of her little daughter born an hour or two before, quietly left his son by her side, and carried the baby to the prison.

If we accept the picture to be a representation of the birth of Kṛishṇa we must assume the scene to be either of the prison cell, or of the dwelling of the cowherdess, and in neither place would the attendants be consistent. I am disposed, therefore, to believe that it is intended for the birth of Buddha. It is true that Buddha is said to have been born in a garden while his mother was leaning against a tree, but she was at the time surrounded by a large retinue of maids, and soon after the birth she was placed on a couch, and this incident is what we see in the picture.

The counterpart of this scene occurs in the Amarávatí stone now in the Indian Museum, and in it are to be found the couch, the reclining figure, and the attendants all but exactly the same, the only material difference being that in the one we have a young elephant, the form in which Buddha descended on the earth, and in the other a little child, the form which he assumed immediately after birth.

The semicircular arch you refer to is not a nimbus, but the back-frame of the bedstead. (See my ‘Antiquities of Orissa,’ p. 103, woodcut No. 30.) I may add that lions are rarely shown in Vaishṇavite sculpture, but seldom omitted in Buddhist scenes. They are the emblems of the title *Siṅha*, which Buddhists are so fond of assigning to the founder of their religion.

It might be said that the temple from which the picture has been brought is a Hindu one, and *à priori* we have a right to expect a Hindu scene in it. But a reference to Capt. J. D. Cunningham’s paper on the Temple of Pathári, will show that the Hindu origin of the fane cannot be satisfactorily established. Capt. C. says “ the general impression left upon the mind by an examination of this temple, is that while it is religiously a

Bráhmañical edifice, it is architecturally and sculpturally an adaptation from Buddhism, and serves to show how old material forms are preserved amid mental changes and the revolutions of sentiments," (J. A. S. B. XVII, p. 310.) In short, it is a Buddhist fane, converted to Hindu worship.* A drawing of the Amarávati stone is to be found in Foucaux's life of Buddha."

MR. H. B. MEDLICOTT exhibited a copy of the new Geological Map of India and said :

The map which I have the honour to lay before the Society, might perhaps be more fittingly handed round for inspection, than hung up in the general view. It is on the tiny scale of 64 miles to an inch, being in fact only an index-map to a Manual on the Geology of India, embodying the results up to date of the labours of the Geological Survey. This work is now well advanced towards publication ; and it will, however imperfectly, supply a demand that has long pressed upon us. The map has been very neatly printed in colours at the office of the Surveyor General of India, and through the kindness of Captain Riddell, R. E., in charge of the Lithographic branch of that office, I have obtained some early impressions ; one has been sent to the Exhibition at Paris and one to Dr. Oldham. This present is the first occasion on which a copy has been seen in India. On the part of my colleagues of the Geological Survey I now present to our colleagues of the Asiatic Society of Bengal this latest produce of our combined labours. In this room, before the busts of Stoliczka and of Dr. Oldham, and in the presence of our President, Mr. William Blanford, we might be tempted to forget the share of this work that is due to unprofessional explorers. To show how erroneous this would be, how broadly the foundations of geology had been laid in India by private hands before an official Survey had any existence, I have also placed before the meeting Mr. Greenough's Geological Map, compiled a quarter of a century ago, by a man who had never set foot in the country, from the observations of early explorers, most of whom were members of this Society. A comparison of the two maps will show a very decided general agreement. It would not be just to push the comparison further. In size and apparent completeness the older map has the advantage, where some considerable blank spaces occur in the recent map, for it was decided that we should put some limit to guess-work. Lines have been put in freely from rapid sketch-surveys, or even from borrowed information ; but we have preferred to leave blank, where the connecting points were too distant and uncertain. As regards details, the minuteness of the map forbids any notice whatever of many points of interest that will be found explained in the Manual, and we have had to

* The country about Pathári is strewn with remains of undoubtedly Buddhist origin. J. W.

club together formations that have long since been distinguished ; as for the great Gondwána rock-system, of which on such a map, we can only show an upper and lower division ; or for the Vindhyan formation, the many sub-divisions of which have all to appear under one colour. But, as I have stated, this map is only an index ; and for many important areas, special maps have already been published.

MR. V. BALL exhibited two stone implements from Parisnáth Hill (District Hazáribágh) and said :—

The two stone implements which I exhibit were received by me from Mr. I. J. Whitty, of Giridi. They are reported to have been found during the clearance of the primeval forest on the northern slopes of Parisnáth Hill, where a tea garden has recently been opened out.

Differing from those which I exhibited from Singhbhúm* and which were interesting as being of the specialised Burmese type, the present specimens (and particularly the larger one) conform to more ordinary types of polished celts, examples of which have been met with in most of the countries of Europe and elsewhere.

As is not unfrequently the case with polished celts, the material of which these are formed is a volcanic (trappean) rock. The large specimen was probably a battle-axe, while the small one, with its carefully ground edge, was no doubt used as a scraper for dressing skins of wild animals.

I hope to hear soon whether any further examples have been obtained from the same locality. In the meantime it is desirable to place on record this new locality.

The following papers were read—

1. *Note on certain peculiarities observed in Hailstones which fell at Khulná, Jessore, on the 31st March, 1878.*—By H. JAMES RAINEY.

On the above date there was an extraordinarily heavy fall of hailstones of rather considerable size, some being as large as a goose's egg. Of course these latter were not single stones, but compound ones, as none of the former are known to attain a larger bulk than that of a pigeon's egg.

As regards the majority of these large stones, their form and structure were rather peculiar. They appeared to be of a discoid form, and their surface was extremely irregular and jagged. From a more or less transparent nucleus about the centre, issued concentric rings of different degrees of opacity, which were very clearly discernible. These peculiarities I have, however, observed before, and I need not describe them more closely, as they are doubtless known to others.

* P. A. S. B. June 1875, p. 118, and June 1876.

What struck me as being especially remarkable about these stones was that when melted they left a sedimentary deposit of a yellowish-brown substance. I found this to be the case at first on placing these stones in a glass of water. Thinking, however, that this powdery substance may have been contained in the water in which I put the stones, or that some earthy matter had adhered to the stones on their falling on the ground, I carefully washed some more stones in clear and pure water, and placed them in a clean glass, and again there was a similar deposit. I then drained off the water, and kept the substance there, with the intention of the next day drying and preserving it, in view of having it eventually analyzed; but, unfortunately, it was thrown away by accident, and has therefore been lost. I have never previously observed this peculiarity in hail-stones; and as it may not be generally known, I have thought it worth while noting down the fact.

It would be interesting to know, if hailstones have been regularly analyzed before, what are their constituent parts,* and whether they vary at different times and places, or not? They appear to have a chemical effect on vegetables, particularly on banana and plantain trees (*Musa sapientum* et *M. paradisiaca*), as they become yellow and seared soon after a fall of hailstones. Even grass on which hailstones have fallen becomes affected in the same way, and contrary to what a shower of rain produces. However, all these changes may be due simply to the low temperature of hailstones. But it cannot in any way account for the sedimentary deposit, which is deserving notice and attention.

The PRESIDENT said, it was unfortunate that the deposit from the hailstones had not been examined microscopically. Atmospheric dust had proved in various cases to contain rather singular constituents, such as diatoms, and recently some blackish powder obtained from melting snow in Sweden had been found to contain iron and a percentage of nickel, and was probably of meteoric origin.

2. *The Application of Photography to the Reproduction of Maps, Plans &c., by the Photo-mechanical and other processes.*—By CAPT. J. WATERHOUSE, B. S. C., *Assistant Surveyor General of India.*

(Abstract.)

This paper opens with an introduction in which a short account is given of the rise and progress of the system of reproducing maps and plans by photography in the Ordnance Survey Office, Southampton, and in India, and of the objects and advantages to be gained by it. The preparation of the original and the production of the negatives is next considered, and then follows a general review of the various photographic processes employed for

* Rain-water is known to contain carbonate of ammonia. H. J. R.

the reproduction of maps, under the heads of Printing on Sensitive Papers, Photolithography or Photozincography, Photocollotype, Woodbury-type, Photo-engraving, Phototypography, and Miscellaneous processes. The paper concludes with a short note on the uses of photography as an aid in warfare. It will be published in full in Part II of the Journal.

The reading of the paper was illustrated by a series of specimens showing the different stages of the process of photozincography and by some specimens of a process of engraving the author is engaged in working out, and of which a description is given in the paper.

The reading of the following paper was postponed—

3. *On the Antiquities of Bogra.*—By H. BEVERIDGE, Esq., C.S.

LIBRARY.

The following additions have been made to the Library since the Meeting held in April last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS, *presented by their respective Societies or Editors.*

Berlin. Die Königliche Preussische Akademie der Wissenschaften,—*Monatsberichte*, December, 1877.

Bombay. The Indian Antiquary,—Vol. VIII, Pts. 77 and 78, March and April, 1878.

Part 78. *J. D. Bate.*—The Wives of Muhammad. *J. F. Fleet.*—Sanskrit and old Canarese inscriptions, Nos. 38 and 39. *Capt. W. S. Brooke.*—Notes on the Custom of Mahaprasad in the Sambalpur District, Central Provinces. *Rāvaji Vāsudeva Tullu.*—Traditionary account of Kālidāsa. *F. M. Mascarenhas.*—Father Thomas Estevas, S. J.

Bordeaux. Société de Géographie commerciale de Bordeaux,—*Bulletin*, Nos. 6, 7, Mars et Avril, 1878.

Boston. The American Academy of Arts and Sciences,—*Proceedings*, Vol. 13, May to November, 1877.

J. P. Cooke, Jr.—Revision of the Atomic Weight of Antimony. *B. Peirce.*—Probabilities of the Three-Ball game of Billiards.

Calcutta. Mahâbhârata,—Vol. III, part 21.

Cherbourg. Société Nationale des Sciences Naturelles,—Memoires, Tome 15, 1876-77.

Halle. Das Verein für Erdkunde,—Mittheilungen, 1877.

Liverpool. Literary and Philosophical Society,—Proceedings, 66th Session 1876-77, No. 31.

London. The Athenæum,—Nos. 2629—2632.

———. The Statistical Society,—Journal, Vol. XL, part 4, December 1877.

———. The Royal Astronomical Society,—Monthly Notices, Vol. 38, Nos. 3 and 4, January and February 1878.

———. Nature,—Vol. 17, Nos. 437—440.

———. The Geological Society,—Quarterly Journal, Vol. 34, part 1, No. 133.

J. F. Turiden.—On possible Displacements of the Earth's Axis of Figure produced by Elevations and Depressions of her Surface.

Munich. Die K. B. Akademie der Wissenschaften,—Historischen Classe,—Sitzungsberichte, Vol. XLVII, Heft. 2 und 3.

———. ———. Philosophische-Philologischen und Historischen Classe,—Sitzungsberichte, Heft 2.

———. ———. Mathematisch-Physikalischen Classe,—Sitzungsberichte Heft. 1 und 2.

Palermo. Società degli Spettroscopisti Italiani,—Memorie, Dispensa 2, 3, Febbraro, Marza, 1878.

Disp. 2. Osservazioni dello Macchie e delle protuberanze solare fatte all' osservatorio del Collegio Romano nel primo semestre, 1877.

Paris. Journal Asiatique,—Tome 10 et 11, Nos. 1 and 2.

No. 2. *S. Guyard*.—Note sur la Métrique Arabe.

Philadelphia. The Academy of Natural Sciences,—Journal, Vol. 8, part 3, 1877.

Rome. R. Accademia dei Lincei,—Atti, Vol. II, Fasc. 3.

Roorkee. Professional papers on Indian Engineering,—Vol. 7, No. 28.

Lieut. C. Hoskyns.—Description of Mandi Suspension Bridge, 240 feet span.
Capt. W. Sedgwick.—Short notes on Mountain Railways for India. *Capt. H. Wilberforce Clarke*.—The complement of Rolling Stock required for a System of Railways.

St. Petersburg. Imperial Geographical Society,—Journal, Vols. 3 to 6.

———. ———. Proceedings, March 1872 to December 1873, 6 parts of 1875, and 7 parts of 1876.

Torino. L' Accademia Reale delle Scienze,—Annuario, anno I, 1877-78.

BOOKS AND PAMPHLETS,

presented by the Authors.

CUNNINGHAM, A. *Corpus Inscriptionum Indicarum*, Vol. I,—Inscriptions of Asoka. Calcutta, 1877.

DOLLINGER, J. V. *Aventin und seine Zeit*. München, 1877.

GUNTHER, A. C. L. G. *Gigantic Land-Tortoises, living and extinct, in the British Museum*. London, 1877.

SMYTH, P. *Edinburgh Astronomical Observations*,—Vol. XIV, 1876-77.

TEMPLE, R. C. *The Lord's Prayer in the South Andaman Language*. Calcutta, 1877.

———. *Notes on the Transliteration of the Burmese Alphabet into Roman Characters, also note of the Vocal and Consonantal Sounds of the Peguan or Talaing Language*. Rangoon, 1876.

MISCELLANEOUS PRESENTATIONS.

Report of the Judicial Administration (Civil) of the Central Provinces for the year 1877. Nágpur, 1878.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Siberian Expedition, Historical part, Vol. I.; Botanical part, Vol. II; Geological part, Vol. III, and a Mathematical part.

The Russian and Chinese Turkestan, Vols. 1 and 2, 1869 to 1873.

The Geography of Asia, 1877.

Ethnography, Vols. II and III.

Statistics of Russia in 1869,—Vols. I, III and IV.

Geological description of Thianshan, 1873.

Geological description of Iran, 1874.

Explorations of Mongolia, 1875, Vols. I and II.

Explorations of the Yenessei River in 1865.

The Geological description of Finland, 1876.

Reisen in Süden von Ost Sibirien in den Jahren 1855-59. By Gustave Radde, Band I and II.

THE IMPERIAL RUSSIAN GEOGRAPHICAL SOCIETY.

PERIODICALS PURCHASED.

Berlin. *Journal für die reine und angewandte Mathematik*,—December, 1877.

H. Lorberg.—Ueber das Elektrodynamische Grundgesetz.

Calcutta. *The Indian Medical Gazette*,—Vol. 13, No. 4, April, 1878.

Giessen. *Jahresbericht über die Fortschritte der Chemie*,—Marz, 1878.

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Stück 11. *A. R. Wallace*.—The Geographical Distribution of Animals, with a study of the Relations of Living and Extinct Faunas as elucidating the past Changes of the Earth's Surface. *Benfey*.—Einige Derivate des Indo-germanischen Verbume *aubh*. *Dr. Lagardi*.—Erklärung Chaldäischer Wörter.

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No. 1321. *Dr. Mann*.—The Lightning Rod.

No. 1322. *General McMurdo*.—Settlement and Military Colonisation in India.

No. 1324. *Dr. P. Higgs*.—Electric Lighting.

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H. F. Weber.—Electromagnetic and Calorimetric Absolute Measurements; the absolute value of Siemen's Unit of Resistance in Electromagnetic Measure; the relation between the Current-work and the Heat-evolution in Stationary Galvanic Currents; and the absolute value of some constant Hydro-electromotive Forces in Electromagnetic Measure. *W. E. Ayrton*, and *J. Perry*.—Rain-clouds and Atmospheric Electricity. *H. C. Russell*.—On a New Modification of the Bichromate Battery. *W. E. Ayrton* and *J. Perry*.—The Contact Theory of Voltaic Action.

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M. R. Pictet.—Memoire sur la liquéfaction de l'oxygène, la liquéfaction et la solidification de l'hydrogène, et sur les théories des changements d'état des corps. *A. Rosenstiehl*.—Recherches sur les matières colorantes de la garance.

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No. 9. *H. Pellet*.—Nouvelle liqueur cuivrique carbonatée pour le dosage du glucose. *L. Boutroux*.—Sur la fermentation lactique.

No. 12. *M. Tacchini*.—Resultats des operations faites en 1877, au bord du soleil, sur les raies, b et 1474. *K. M. Broun*.—Sur la période de rotation des taches solaires.

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No. 37. *C. Semper*.—Les Articles et les Annélides.

No. 38. *J. Delboeuf et W. Spring*.—Le Daltonisme, recherches experimentales et théoriques. Enoncé du problème.

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BOHTLINGK, OTTO. *Sanskrit Chrestomathie*. St. Petersburg, 1877.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL.

FOR JUNE, 1878.

The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 5th June, at 9½ o'clock P. M.

W. T. BLANFORD, F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced.

From M. Garcin de Tassy, "La Langue et la Littérature Hindoustanies," en 1876, 1877.

From the Secretary to Government of India in the Home Department, "Macnamara's History of Asiatic Cholera."

From the Muséum d'Histoire Naturelle de Lyon, the "Archives" of the Museum, Vol. I., for 1876, and Compte Rendu de l'Association des Amis des Sciences Naturelles, for 1876.

From H. F. Blanford, Esq., 'Indian Meteorological Memoirs,' also, 'Report of the Meteorology of India in 1876.'

From the Secretary to Government, N. W. P., a 'Catalogue of Sanskrit MSS. in private Libraries in the N. W. Provinces and Oudh.'

From the Marine Survey Department. 'Chart of West Coast Malay Peninsula, including Kopah Inlet and Jankseylon', also 'Chart of Patni Bay.'

From the Government of India, Home Department, 'Report on Publications issued and registered in the several Provinces of British India, during the year 1876.'

From Dr. Rajendralala Mitra, 'Saddharrua Sutram', in Guzerati, by Narajana binna Chandra.

From Pratap Narain Sing, 'Dharma-bhava Samvaleta Sarira-tatva.'

From the Chief Commissioner, Central Provinces, 'Report of the Judicial Administration (Criminal) of the Central Provinces for 1877.'

Mr. BLOCHMANN said—The Society has received since the last meeting the following coins—

(1.) Twelve small silver coins. They all belong to the Kanauj series, and are very common.

(2.) From Lieut.-Col. C. Martin, Agar, W. Málwá, 3 silver coins and 5 copper coins. The silver coins are Hindu. Among the copper coins there is one struck by Mubárah Sháh of Dihlí, and another struck by Ibráhím Sháh of Jaunpúr.

(3.) A copper coin struck by Iltitmish (Altamsh) of Dihlí. The coin is well known.

(4.) From the Foreign Office, through the Hon'ble Sir E. C. Bayley, K. C. S. I., one gold coin and two silver coins. They were received from the Rájá of Sukét, and are said to have been struck from old dies in possession of the Rájá and handed down from his ancestors. The gold coin and the larger silver coin are 'Alá-uddín Muhammad Sháhís. The small silver coin is a Muhammad Sháh of 1155 H. The two first are struck, the last looks as if it had been cast.

(5) From the Trustees of the Phayre Museum, Rangoon, 5 Burmese silver coins.

These were described in the Proceedings for April.

The following gentlemen, duly proposed and seconded at the last Meeting, were ballotted for and elected Ordinary Members—

C. S. Bayley, Esq., C. S.

Lieutenant R. C. Temple.

The following is a candidate for election—

H. L. St. Barbe, Esq., C. S., Assistant Political Agent, Bhamo, proposed by R. B. Shaw, Esq., C. I. E., seconded by W. T. Blanford, Esq.

The SECRETARY announced that Major H. C. Marsh and Capt. E. A. Fraser had intimated their desire to withdraw from the Society.

The PRESIDENT announced that news had been received, since the last meeting of the Society, of the death of Dr. T. Thomson, one of the Honorary members of the Society. He said—

We have to regret the loss of one of the most eminent of Indian naturalists, one who, although prevented by failing health from carrying out the work to which he had devoted his life, the completion of a *Flora Indica* worthy of the country, has nevertheless, by his collections and labours, done much to facilitate the completion of the work by others.

Dr. Thomas Thomson was born in Glasgow in 1817, and was the son of the well-known Professor of Chemistry in the University of his native town. He was a fellow student of Sir Joseph Hooker, his intimate friend

and associate throughout life. After completing his studies at the Glasgow University and taking the degree of Doctor of Medicine, Dr. Thomson entered the medical service of the East India Company in 1839. Very soon after his arrival in India, he was attached to a part of the army in Cabul, and in 1842 he was taken prisoner by the Afghans at Ghazni, whilst serving with the 27th N. I. After the close of the Afghan war and the delivery of the prisoners, Dr. Thomson was engaged for many years in the North West Provinces and the Punjab, and he was attached to the army in both the Sikh wars. In 1847, he was sent by the Governor-General, Lord Hardinge, with Major Cunningham and Captain Henry Strachey on a mission to the Upper Indus valley in Tibet. This journey lasted from August 1847 to October 1848, in the course of which time Dr. Thomson penetrated to the Karakorum Pass, and traversed a large area of country now well-known, admirably mapped, and the yearly resort of tourists and sportsmen, but then difficult of access and scarcely indicated on the existing maps. Large botanical collections and a series of valuable and interesting physical and geological observations were the result of this journey. Almost immediately after returning, Dr. Thomson went to Darjiling and arrived there in time to welcome his friend Dr. Hooker, when the latter with Dr. Campbell were released from captivity in native Sikkim. With Dr. Hooker, Dr. Thomson then visited the Khási Hills, and shortly after returned to England, where he spent some years on furlough.

From 1855 to 1861 Dr. Thomson was superintendent of the Botanical Gardens, Calcutta, and must be still remembered by many of the members of this Society. Besides numerous other undertakings he was busily engaged on the *Flora Indica*, which he commenced in association with Dr. Hooker. He joined this Society in 1855 and was six times elected to the Council, three times as Vice-President. His health, however, had suffered greatly, and when he retired and returned to Europe in 1861, it was for a long time doubtful whether he would live many months. His health ever since has been most precarious.

Dr. Thomson's principal works are his "Western Himalaya and Tibet," an account of his journeys in Cashmere, Ladak &c., and the introduction to the *Flora Indica*, which he wrote conjointly with Dr. Hooker, and which is well-known as one of the most masterly botanical essays ever written. By these his work in India will long be preserved in memory, but to all who had the advantage of knowing him personally, he will be ever better remembered for his kindly nature. Few residents in Calcutta had a wider circle of friends, none were more generally esteemed and beloved than Dr. Thomson.

The SECRETARY reported that Mr. W. E. Bateman's appointment as Assistant Secretary had been confirmed by the Council.

The Council reported that the following rules had been drawn up for the management of the Society's Library.

Rules for the Library, Asiatic Society.

1. The Librarian shall keep a register of books belonging to the Library, showing their registered number, title, name of author, date of receipt, whence obtained, price if purchased, edition, size, number of volumes, number of plates, place and date of publication.

2. All books, pamphlets and periodicals received for the Library, shall immediately on receipt, be entered in the Library Register, and stamped with the Library stamp, the registered number and date of receipt being written in the centre of the stamp. The Librarian shall see that each plate and map in books received for the Library is carefully stamped on the reverse side with the Library stamp. New books received shall be stamped on the cover with the words '*Asiatic Society of Bengal.*'

3. A book shall be kept, in which shall be entered the title of every work lent out, the number of plates, if any, it contains at the time of being lent, the name of the member borrowing the same, and the date on which it is lent. A member applying in person for a work shall sign a receipt for the book and plates it may contain, at the time of borrowing. A member not applying in person shall send a written request for the books he requires, and this request shall be filed in the Library, as a voucher, the Librarian duly noting on it the books actually lent out. The Librarian shall send with each packet of books, a form of receipt, to be signed and returned by the borrower. Should any member prefer to keep a private register of books borrowed from the Library, it shall be the duty of the Librarian to enter in such register the names of all books issued and to initial their receipt when returned.

4. On return of any book to the Library, the Librarian, after satisfying himself that the book is in the same condition as it was when lent out, shall insert opposite to the entry, in the loan register, the date on which the book has been returned, and return to the borrower the receipt, or other voucher given by him, duly cancelled. And if on the return of any book the Librarian shall perceive that it has sustained any damage, since it was taken from the Library, he shall make a note of the particulars and report the same to the Secretary.

5. No member shall remove any book, pamphlet, periodical, or any other article, the property of the Society, from the Library or Reading-rooms without giving the Librarian a receipt for the same.

6. No Book, Pamphlet, Journal, or Periodical &c. shall be lent out before the expiration of one month after its receipt in the Library.

7. Periodicals and unbound Journals in numbers shall be returned after the expiration of one week.

8. A list of the Books, Periodicals and Works of Reference which must not be taken out of the Library without special permission of the Council, shall be placed in a conspicuous position in the Library, and such books shall be marked with a star in the Catalogue.

9. Non-resident members are entitled to take out books, plates, drawings and manuscripts from the Library under the provisions of Rule 14~~6~~ of the Society's Byelaws, *viz.*: on making special application to the Council, and signing an obligation to defray the expense of carriage and to make compensation for any book, plate, manuscript, &c., which may be lost or damaged.

10. No member shall be permitted to have more than 10 sets of books from the Library in his possession at any one time without the special permission of the Secretary.

11. Not more than two MSS. shall be lent out at any one time, to the same person, except with the sanction of the Council.

12. Except with the special sanction of the Council, Members shall not be permitted to keep books, &c., borrowed from the Library for more than three months.

13. All books except in the case stated below shall be returned to the Library before the 1st January in each year. Early in December, the Librarian, having previously ascertained that the books are actually absent from the Library, shall forward to all members who have books belonging to the Society in their possession, a letter requesting that such books be returned before the end of the month. Non-resident members who, on the 1st January, have had books &c., from the Library for less than 3 months may send a detailed list of such books instead of returning them.

The Librarian shall report to the Council each year at their meeting in January, the names of all books not returned, and of the members by whom they were borrowed, and the Council may, if they think proper, suspend the names of such members in the Reading-room.

14. If application be made to the Librarian for a book already taken out from the Library, he shall issue a notice to the borrower, requiring him to return it, free of expense, within one week from the receipt of such notice, if a resident member, and within 15 days, if a non-resident member.

15. If any book borrowed from the Library be lost or damaged, the borrower shall be held responsible for such loss or damage, and if the book belong to a set, he shall be held liable to make good the set to the satisfaction of the Council, or pay its value.

16. No book &c. shall be issued from the Library to any member while he retains any property of the Society in contravention of the above rules.

17. A book shall be kept in the Library in which members may write the names of any books, &c., they may recommend to be purchased for the Library.

18. No person who is not a member of the Society shall be permitted to take away any book from the Library without special authority from the Council, or to have access to the Library without permission of the President or of one of the Secretaries.

19. In no case shall any member be allowed to take out of India (as defined in rule 32) any Book, Manuscript, Pamphlet, Periodical &c. belonging to the Society.

20. The Librarian shall have under his charge all Manuscripts, Rubbings of inscriptions, Photographs, Drawings, Maps, and Copper-plate grants belonging to the Society, and shall keep a separate register of each.

21. The Librarian shall be held personally responsible for the safety of the Books, Manuscripts, Photographs, and other articles belonging to the Society's Library under his charge, and that these rules are properly carried out, as far as lies in his power.

The SECRETARY announced that a letter had been received from the Schwann Memorial Committee, Liège, Belgium, asking for the co-operation of the Asiatic Society at an anniversary festival to be held in honour of Schwann, the discoverer of the analogy of the structure of animals and plants.

The SECRETARY announced that a letter had been received from the Geographical Society of Lyons, giving an account of a large Geographical Globe, constructed in 1701, by Henri Marchand, and asking the assistance of the Asiatic Society in forwarding geographical information, to enable the Society to publish an account of the early geographical researches during the 10th century.

Mr. W. T. BLANFORD exhibited two skins of adult wild swans, shot by Mr. H. E. Watson at Baháwalpur, near Sehwan, in Sind, on the 12th February last, and clearly belonging to the mute swan, *Cygnus olor*, the same as the tame swan of England. Mr. Blanford pointed out that this was the first time that the occurrence of this bird had been recorded so far to the southward or that the adult had been shot in India. Mr. Watson saw wild swans on two occasions during the past cold season, once on the Manchhar lake near Sehwan, in January, and the second time at Baháwalpur, in the Sehwan district, on February 12th, on this latter occasion he succeeded in shooting three.

The only other cases in which swans had been previously procured in India were noticed by Mr. Brooks in the Proceedings of the Society for April, 1872, p. 63. So far as Mr. Blanford was aware, no subsequent notice of the occurrence of swans in India had appeared. The only previously recorded instance in which *C. olor* had been obtained was in the extreme

north-west of the Punjab, where two immature specimens were obtained in 1871 by Captain Unwin and described by Mr. Hume (*Ibis*, 1871, p. 412.).

The occurrence of these birds in Sind must be very unusual, for they were, Mr. Watson says, quite unknown to the fishermen, all of whom are fowlers and know every water-bird in the country well.

Mr. Blanford also called attention to a third skin of a wild swan exhibited by Dr. J. Anderson, who was unable to attend the meeting. This bird was shot at Attock, in the upper Punjab, on the 17th January last by Lieutenant G. P. Hill, of the Rifle Brigade, and presented to the Indian Museum. It proved also to be a specimen of *O. olor*, but rather younger than the two specimens from Sind, the tubercle on the bill not being developed.

The following papers were read—

- 1.—*On the Antiquities of (Bagurá) Bogra*.—By H. BEVERIDGE, C. S. Rangpur.

This paper will appear in No. I of the Journal, Part I, for this year.

- 2.—*Note on the absence of a Horn in the Female of the Sundarban Rhinoceros and Javanese Rhinoceros* (Rh. Javanicus, Cuv.)—By H. J. RAINEY.

Having read with great attention Mr. O. L. Fraser's graphic "Note on a partially ossified Nasal Septum in *Rhinoceros Sondaicus*," which appeared, accompanied with a plate clearly illustrating it, in J. A. S. B., 1875, pp. 10-12, I found a fact mentioned, which, as far as I am aware, has never been before noticed, namely, the absence of a horn in the female of the Sundarban Rhinoceros. As regards this point, Mr. Fraser stated: " * * what is very peculiar, the female has no horn whatsoever." This induced me to endeavour to ascertain if the female of the Javanese Rhinoceros, which is considered to be of identical species with the Sundarban animal, possesses a horn or not, for if the former did not, it would clearly be a distinct and new species. I accordingly applied to Dr. Günther, keeper of the British Museum, Zoological Department, for information on the subject, and that gentleman was good enough to forward to me answers to more than a score of questions on that and other points. But, as his answers were based on an examination of a single specimen of "a skeleton obtained from Java of a Dutch dealer,"* the sex of which was "unknown," the information was of course inadequate, as Dr. Günther himself remarked: "I am afraid the data thus obtained will not be sufficient to settle the distinctness of the Java and Sundarban

* The only one of the kind, I believe, in the British Museum, at least then.
H. J. R.

one-horned Rhinoceros, which, however, I consider very probable." The animal was described, in answer to one of the questions, as "not quite full grown, the last molar not quite grown to the head of the stem." The length of horn was given as $8\frac{1}{2}$ inches, and the circumference at the base 19 inches. In reply to the question, whether the female had a horn or not, the answer was "not known."

As the above answers did not at all dispose of the question raised, I addressed a letter to Meinherr W. P. Groenveldt, Secretary of the Batavian Society of Arts and Sciences, in the early part of the current year, asking to be informed positively, whether the single-horned Rhinoceros of Java (*Rh. Sondaicus*, Müller,) is provided with a horn or not. I also asked, whether that species possessed a partially ossified *septum narium* or not. His letter,* in reply to mine, I have just been favoured with, and as it is concise and directly to the point, I may as well quote it at length. It runs as follows :

"Before replying to the question contained in your letter of January 4th, I have consulted two of my friends, Dr. Ploem and Dr. de Gavere, both experienced zoologists, and as their opinion quite agrees with my own experience, I think the following information may be regarded as *positive*.

"The female of the *Rhinoceros Sondaicus* (we prefer calling it *Rh. Javanicus*, following the older name by Cuvier) is not provided with a horn, but has only a slight rugged protuberance on the skull bone, which is just visible on the skin too.† The natives say that the female also has a horn sometimes, but I suspect this to be nothing more than a greater development of the protuberance in aged specimens.

"The *septum narium* is always partially ossified, but never to such a degree as in the fossil remains of the *Rh. tichorinus*. In very aged specimens the nasal septum may be quite ossified, but I have never seen any, and, as far as I know, the ossification agrees with that of the other known species."

There can now be hardly any doubt that, the one-horned Javanese Rhinoceros and Sundarban Rhinoceros are of identical species, as asserted by Blyth and other well known zoologists.

The PRESIDENT said—that the question of the specific distinctions between the different kinds of Rhinoceros had lately been investigated by Professor Flower, in the Proceedings of the Zoological Society for 1876,

* Bearing date the 20th April, 1878. H. J. R.

† In a photograph of a young female Sundarban Rhinoceros now before me, I observe a prominence there, also. H. J. R.

p. 443, and all the known species except the white African Rhinoceros, *R. sinas*, had been beautifully figured by Mr. Wolf to illustrate a paper by Dr. Sclater in the Transactions of the Zoological Society (Vol. IX, Part 11.) The general consensus of opinion, founded on various characters, was that the Javanese and Sandarban Rhinoceroses were identical. In Plate XCVI of the Transactions just mentioned, the *Rhinoceros* from Java is represented and the figure can be compared with the Sundarban animal.

3.—*Notes on Reptilia from the Himalayas and Assam.*—By W. T. BLANFORD, F. R. S.

(Abstract.)

The following species are described as new :

Draco major; the largest form of the genus known, allied to *D. dussumieri* and *D. quinquefasciatus*; nostrils directed upwards, tympanum naked, a small tubercle behind the orbit, no nuchal crest, the hind-leg falls short of the armpit when laid forward; gular appendage long, covered with large smooth scales, each fully twice as long and broad as an abdominal scale. A row of enlarged scales, at a distance from each other, along each side. A crest of large pointed scales along the hinder part of the thigh and each side of the tail near the base. The largest specimen measures 14 inches, of which the tail is 9·25. Head and body, in 3 males, 4·75 in. long. The only female procured is smaller and has a very short gular appendage. From near Tavoy: four specimens.

Bronchocela burmana: lateral scales in 23 to 25 longitudinal rows, dorsal row rather larger, scales of abdomen much larger, in about 12 rows, all sharply keeled. Nuchal crest small, no enlarged shields behind the supercilium. Colour green throughout. From near Tavoy: one specimen.

Ulupe davisoni, new genus and species of *Lycodontidæ*. Head short, depressed, distinct from neck; body slender, compressed. Pupil vertical, *nostril in a single shield, loreal and single præocular united*, two postoculars, supralabials 7, third and fourth entering the orbit. Scales of body smooth, *in 13 rows*. Ventrals 265, strongly angulate at the side, anal undivided, subcaudals in 108 pairs. Maxillary teeth few in number. Colour above black with white cross-bands, lower parts white, mottled with dusky behind. Foot of Nawlabu hill, west of Tavoy: one specimen.

Ophites gammiei: scales in 19 rows, the dorsal rows keeled, lateral smooth. Body slender, compressed; head broader, flat. Ventrals 214, bluntly angulate at the sides, anal entire, subcaudals 101 pairs. Anterior frontals small, each about one-third of a post-frontal, and as long as broad, post-frontals much broader in the middle than they are in front and behind, and

bent over the side of the head above the small loreal. Upper labials 8, third, fourth and fifth entering the orbit, 1 præ-, 2 post-oculars. Body surrounded by alternating light and dark rings with irregular margins. From the Cinchona plantations, British Sikkim: one specimen.

4.—*The Bangash Nawábs of Farrukhábád. A Chronicle (1713-1857),*

Part I.—By WILLIAM IRVINE, C. S.

(Abstract.)

The founder of the family, Nawáb Muhammad Khán Ghazanfar-Jang was born, between 1665 and 1670, at Mau-Rashídábád, near Káimganj, twenty-one miles west of Farrukhábád. He was the second son of Malik Zain Khán, a Kághzai Kaoláni Pathán of the Bangash tribe, who settled in that town in the reign of Aurangzíb-Alamgír (1658-1707). His early years were passed as a commander of free-lances in Bundelkhand. In 1713, he joined the standard of Farrukhsiyar and fought in the van at the battle of Samogar. After the victory he was made a Commander of Four Thousand and received *jágírs* in Bundelkhand. In 1714, he founded Káimganj, Muhammadábád and Farrukhábád, having obtained a grant of the parganahs of Shamshábád and Bhojpúr. After the murder of Husain 'Alí Khán Bárha, again espousing the winning side, he fought under Muhammad Sháh in the battle of November 1720, where 'Abdullah Khán Kutb-ul-Mulk was defeated and captured, Muhammad Khán was advanced to be a *Panj-Hazárí* and subsequently to the rank of *Haft-Hazárí*. He was governor of Alláhábád (1722-1730), of Málwá (1731), and again of Alláhábád (1735). He died at an advanced age on the 9th December 1743, and was buried in the Hayát Bágh, outside the Mau gate of Farrukhábád. He had twenty-two sons.

The eldest son, Káim Khán, succeeded and ruled for five years. At the instigation of Safdar-Jang, wazir of Ahmad Sháh, he invaded Rohilkhand, and on the 23rd November, 1748, he was killed, with most of his chief men, in the battle fought at Dauri-Rasúlpur, a few miles south-east of Badáon. Imám Khán, a younger brother, succeeded, but six months afterwards he was made a prisoner by the wazir and sent to Alláhábád, where his life with that of four brothers was taken. The territory was resumed by the wazir and made over to his deputy, Rájá Naval Ráo, Káyath. Not long afterwards the Patháns rose and on the 1st August 1750, headed by Ahmad Khán, second son of Nawáb Muhammad Khán, they defeated Naval Ráo on the banks of the Kálí river near Khudáganj, seventeen miles south-east of Farrukhábád. Naval Ráo was shot in the head. Meanwhile the wazir in person was approaching from Dilhí. The decisive battle was fought on the 13th September, 1750, at a place called Rám-

Chatauni, half way between Paṭiálí and Saháwar, in the Etá district. The wazír received a graze from a spent shot, and his troops believing him to be dead gave way. A signal victory was obtained by the Patháns. Instead, however, of advancing on Dilhí, Ahmad Khan turned eastwards and occupied the whole of the Audh and Alláhábád territories. The fort of Alláhábád alone resisted, and after having wasted several months in an unsuccessful siege, the nawáb was recalled in haste to defend his inherited domains. The wazír with the aid of the Mahrattas had already expelled his troops from the parganahs to the west of Farrukhábád. In April 1751, Nawáb Ahmad Khan was invested in the fort of Fathgarh, and a month and some days had elapsed, when Sa'dullah Khán Rohela, who was marching to his relief, having been defeated on the other side of the river, Ahmad Khán made his escape with some difficulty to Anwala, the Rohela headquarters. After the rains the wazir and the Mahrattas crossed the Ganges. The Bangash and Rohela forces then retreated to Chilkya at the foot of the hills, where they entrenched themselves. After some months of desultory fighting a peace was made. To meet the pay due to the Mahrattas by Safdar Jang, about one half of the Bangash territory was made over to them. The country left to the nawab, known as the sixteen and a half maháls, consisted of nearly the whole of the Etá and Farrukhábád districts, and about half of the present district of Mainpurí. In the great battle of Pânipat in January 1761, Ahmad Khán fought with destruction on the right wing of Ahmad Sháh Duráni's army. Ahmad Khán died on the 12th July, 1771, the day that Sháh 'Álam entered Farrukhábád on his way from Allahábád to Dilhi.

Ahmad Khan's eldest surviving son, Diler Himmat Khan, succeeded under the title of Muzaffar Jang. In 1774, this nawáb became tributary to Shujá'-ud-daula, nawáb-wazir of Audh, paying to him four and a half lakhs of rupees annually. About the year 1786 this tribute was made over to the English in part payment of the subsidiary force stationed at Fathgarh. On the 23rd October, 1796, Muzaffar Jang died suddenly from poison, supposed to have been administered at the instigation of his eldest son Rustam 'Alí Khán. This eldest son was deported to Lakhnau by Ásaf-ud-daula, and the second son Imdád Husain Khan, Násir Jang, succeeded. In this nawáb's time was negotiated the treaty of the 24th June, 1802, (Aitchison VII, 36,) making over the Farrukhábád territory in return for an annual payment. Násir Jang died of hard drinking on the 1st February, 1813. He was succeeded by his minor son Khádím Husain Khan, Shaukat Jang. He died at Dilhi on the 24th July, 1823, of small-pox. Tajammul Husain Khan, his son, succeeded. On his death in November 1846, he was followed by his cousin Tafazzul Husain Khan. This nawáb joined the rebels in the Mutiny, but his life having been promised at his surrender,

he was not executed. He now lives at Mecca, and gains a living, it is said, by copying Kuráns and painting small pictures of the holy places. His son Asghar Husain Khán, now about twenty-two years of age, lives in Farrukhábád.

Contents of Part I. NAWAB MUHAMMAD KHAN, origin of the family. Muhammad Khan's early years. He enters the Imperial service. He founds Káimganj, Muhammadábád and Farrukhábád. The city of Farrukhábád. Events from 1719-1726. Invasions of Bundelkhand. Campaign in Málwá. Campaigns against the Mahrattas (1732-1736). Re-appointed to Allahabad. Nadir Shah's invasion. Muhammad Khán intercedes for Alí Muhammad Khan Rohela. Affair about Rae Náráyan Dás. Story of a mango. Muhammad Khan's death and his character. His Chelas. His territory. His wife and children. Note A. Ráshid Khan and the Khán-zádahs. Note B. The Bamtelas. NAWAB KAIM KHAN. Account of his reign, his wives &c., &c. Rohilkhand affairs. Accession of Ahmad Shah. Káim Khan's defeat and death. NAWAB IMAM KHAN. The confiscation of the territory. NAWAB AHMAD KHAN. His accession. Battle of Khudáganj and death of Naval Ráe. Advance of the Wazír. Execution of the five princes. Execution of the five Chelas. Defeat of the wazir. Siege of Allahábád fort. Siege of Fathgarh and flight of the Nawáb. The campaign in Rohilkhand. Attack by the Atíths of Rájah Indar Gir. Visit of the Almorah Rájah. Negotiations through 'Alí Kulí Khán. Intrigues in the Pathán camp by Mahbúb 'Álam. Renewal of negotiations, followed by peace. Ahmad Khán marries again. First visit of Ghází-ud-dín Khán 'Imád-ul-mulk. Ahmad Khán at the battle of Pânipat. Visitors to Farrukhábád. Shuja'-ud-daula and Sháh 'Álam attempt to attack Farrukhábád. Shujá'-ud-daula takes refuge at Farrukhábád. Muzaffar Jang's marriage. Mahratta affairs 1752-1771. Ahmad Khan's blindness and death. Anecdotes showing his habits and character. His wives. His children. His Chelas. I. Chronological table of Nawábs of Farrukhábád. II. Tables of Ahmad Khán's descendants. III. Table of Sa'dulla Khán, Burhan-ul-Mulk's family. IV. Table of Safdar Jang's family.

5.—*Notes on the Earthquake in the Punjab of 2nd March, 1878.*—By A. B. WYNNE, F. G. S.

(Abstract.)

This paper comprises such information regarding the above earthquake as the author was able to collect from the different stations in the northern part of the Punjab which were affected by it.

It will be published in the Journal, Part II.

The PRESIDENT said that it was extremely desirable that careful records should be obtained of the various earthquake shocks so frequent in India.

He would venture to point out how much more prevalent such shocks were in the neighbourhood of the great river plains than elsewhere. Assam, the Himalayas, Sind and Cutch were far more subject to earthquakes than the peninsula, that is to say, the countries which had at a geologically recent date undergone great disturbance were far more affected than those which had remained comparatively undisturbed. He suggested that the elevation of the Himalayas, of the Sulemán and other ranges west of the Indus, and of the mountains of Assam might perhaps still be in progress from compression, whilst the disturbing cause might be the constantly increasing pressure of the great areas of deposition in the deltas of the Ganges, Brahmaputra and Indus, and the subsidence due to such pressure. A similar effect was being produced in the valley of the Irrawady, another earthquake centre.

LIBRARY.

The following additions have been made to the Library since the Meeting held in May last.

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No. 16. *M. P. Tacchini*.—Observations des taches et des protubérances solaires, pendant le 1^{er} trimestre de 1878.

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Major T. H. Lewin, Deputy Commissioner, Darjeeling, (for re-election), proposed by W. T. Blanford, Esq., seconded by A. W. Croft, Esq.

Dr. E. Laurie, Medical College, Calcutta, proposed by Dr. Partridge, seconded by Capt. Waterhouse.

The Council reported that Mr. Medlicott had undertaken the duties of General Secretary during the absence of Capt. J. Waterhouse on leave.

The Rev. Fr. Lafont exhibited two microphones and explained their construction and working. He said—The Microphone of Prof. Hughes consists essentially in the introduction of an imperfect contact at a point of an electric circuit comprising a telephone. Two pieces of carbon loosely connected by a third piece and supported by a thin board on a sounding-box, form a very delicate transmitter of sounds. The vibrations communicated to the loose piece of carbon, produce variations in the points of contact and this causes similar variations in the current passing through the telephone thus reproducing in the latter instrument the original sonorous vibrations.

In its present crude state the microphone may be extremely useful in any case where a monotonous or periodical sound is to be sent to a distant station. It might for instance be used for placing any station in direct communication with the chronometer of an Observatory and thus facilitate astronomical operations in the determination of Longitudes.

The microphone when reduced in sensitiveness and rendered more manageable by the addition of two very delicate springs to the loose piece of carbon, could be employed for articulated speech, and produced these sounds very much louder than the Telephone. A person standing some 15 or 20 feet from the microphone and speaking towards it, was distinctly heard in the distant Telephone.

Two different kinds of Microphones were then circulated, and afterwards used to convey the ticking of a watch from one of the rooms to another, distant about 40 yards: one of the instruments had a vertical piece of graphite between two carbon blocks; the other consisted of five small pieces of carbon enclosed in a glass tube and mounted on a sounding-box.

The PRESIDENT said that considering the very short period—only a month—that had elapsed since news of the discovery of the microphone had been received from Europe, the meeting was greatly indebted to Father Lafont for an opportunity of examining this remarkable addition to the series of interesting inventions of which the telephone had been the origin.

The following papers were read—

1. *Notes on a Map of the Mughal Empire.*—By H. G. KEENE, C. S., *Agra.*

The accompanying map\* is an attempt to show the arrangement of the various Provinces at some central period, say in the early years of Aurangzib;

\* The Council do not think it necessary to reproduce the map. Ed.



after all claims to Kandahár and other northern Provinces had been abandoned, and before the Mahratta confederacy had begun to dispute the Mughal supremacy in the south.

Originally, the Empire as described by Abul Fazl in the 40th year of Akbar consisted of twelve subahs besides later-acquired territory which had not at that time been completely organised with the Imperial Cosmos. In later times, the number of these provinces averaged twenty; for, though there are as many as twenty-seven named in some lists, yet they are either produced by splitting lesser provinces or such as were never held all at one period. The land revenue of the twelve *subahs* is stated by Abul Fazl to have aggregated over nine *krors* of Rupees, a sum which in his detailed lists, with the addition of land and sea-customs and income derived from the inorganised provinces of Sindh and Kashmir, he brings to nearly one *kror* more, or say Rs. 99,613,850. A large but unascertained contribution must also be allowed in the services of the *Bumi* (or “*landwehr*”) a large irregular militia of horse, foot, and artillery assessed on the various districts independent of the levies maintained by the Mansabdars and the standing army of the Crown.

It would be indecorous to omit the mention of Mr. E. Thomas, F. R. S. in this connection. That distinguished scholar and numismatist has on various occasions (see his *Prinsep*, Vol. II., his *Chronicles*, and *Revenue Resources*) made efforts to bring the figures of the *Ain* into harmony with estimates elsewhere derived. Finding, for example, that an accountant of Akbar’s estimated the total revenue at 640,000,000 *tankas*, Mr. Thomas concludes that this equals £32,000,000 sterling, and hence concludes that Abul Fazl has meant to state double the figures that he has stated, and that this must be doubled again by the addition of what in modern Anglo-Indian parlance is called “Separate Revenue.” Four times ten however would not yield thirty-two, but forty—even if the exchange value of ten Rupees to one pound English could be proved to have obtained in Akbar’s time, of which there is no proof. Moreover, the proposed emendation of the text (from “three” to “six” *arbs* of *dáms*) does violence to all known versions of the *Ain Akbari*.

The following is a strict translation of the important words, taken from Professor Blochmann, Calcutta, text III, 386;—

“In the 40th year of his reign the Emperor Akbar had a decennial settlement of his dominions at the annual revenue of three *arbs*, sixty-two *krors*, ninety-seven lakhs, fifty-five thousand, one hundred and forty-six *dáms*, or Rs. 90,749,881-2-5.”

This tallies with other texts including the Lakhnau lithograph of Munshi Nawal Kishor, which is highly esteemed by native scholars.

Four other provinces are mentioned by Abul Fazl; namely, those of

Multán and Tattah, forming the modern Commissionership of Sindh and part of the Punjab; and Kashmir with Kábul, a mountainous region, assessed chiefly in kind, and chiefly valued for purposes of sport and luxury.

The following specification of each province is abstracted from the same work; I have not thought it necessary to add the figures from the separate *Taksim Jamas* or detailed rent-rolls which, though not prepared apparently quite at the same moment as the descriptive parts, do not exceed the estimates there given very seriously, seeing that they contain some further items of separate revenue. Each province was in area about equal to an average European kingdom. Of these provinces the most eastern was BENGAL forming with Orissa a vast and fertile tract assessed at about one and a half *krors* of Rupees. The capital was at Gaur or Lakhnauti. BAHAR (often united with Bengal under the general title of "the Eastern Subahs") was the very finest part of the Gangetic valley, both in climate and natural advantages. It had both on the north and south fine mountain ranges for limits; abundant streams watered the soil. The name of the capital is not given in the *Ain*, it was probably at Patna. The land revenue was over forty-three lakhs.

ALLAHABAD and AUDH, often held by the same *Subahdár*, resembled Bahar in size, character and conformation. The capital of the one was at Prayág, and derived from Akbar the name it communicated to the entire district. The capital of the other—Audh or Ajudhia—was near the site of the modern Faizábád. The aggregate land revenue was about a *kror* and a third.

AGRA (formerly Biána) was a compact division extending from Kalpi to Rewári, and from Aligarh to the southern boundary of Narwar. Besides the metropolis it contained Gwáliar and other walled towns, cities and fortresses; the land-revenue was over a quarter of a million.

MÁLWA, a large province formed out of a conquered kingdom—stretched from the borders of Allahabad to those of Gujarát, and was famous for its woods, waters, wild flowers and fine scenery. The climate was much-esteemed and its fertility proverbial. Mándu was regarded as the capital; the land revenue exceeded sixty lakhs of Rupees.

KHÁNDES (named Dándes by Akbar in honour of his son Dányál) was a small but pleasant province between the Narbada and Tapti rivers, intersected by the Satpura hills, and having for capital the ancient fortified city of Burhánpur so often mentioned in the history of mediæval India. The land revenue was about seven lakhs and a half. The local governor in troubled times occupied the neighbouring fort of Asergarh, regarded as one of the strongest places in the empire.

GUJARÁT, another old Musalmán kingdom, was of great extent and

yielded a revenue—inclusive of customs—which exceeded a *kror* of Rupees. This province was largely washed by the sea; and, besides the native capital Ahmadábád, contained Baroda and other large towns. The Portuguese had a settlement at Surat and made encroachments, towards the end of Akbar's reign, over the neighbouring districts.

The so-called Subah of AJMÍR was one of the largest provinces, answering nearly to the modern Rajputána. It was divided into three principal chiefships, Mewar, Marwar and Harauti—corresponding to the modern Rajadoms of Udaipur, Jodhpur and Kota-Bundi. Other principalities, such as Dhundar (Jaipur) were not apparently thought of much importance by Abul Fazl, as they are not named in his list. The country was fine, the climate healthy, and the population hardy; but the revenue was nothing more than a tribute estimated by Abul Fazl at Rs. 5,71,000 and paid (when payment could be compelled) by the Hindu chiefs who had been there before the Mughals came, and who very likely will be there after the British are gone. The Emperors were fond of the town of Ajmír, where a famous stock of Persian *darvishes* or hermits (the Chisties) had taken root. They also intermarried with the houses of Jaipur and Jodhpur; but the province can only be reckoned nominally among *Subahs*.

DIHLI was a province of average size, with a capital of the same name, and a revenue of one and a half *kror* from land.

LAHOR was a rather larger one, with a capital of the same name and a revenue of nearly the same amount as Dibli.

MULTÁN was a long strip of sandy country lying along the left bank of the Indus. Capital Multán: revenue, nearly forty lakhs.

TATTAR was the rest of the Indus Valley; the revenue only about one lakh and sixty thousand Rupees.

KASHMÍR, "the happy valley," and the scarcely less beautiful hills and dales of Kabul, were the Piedmont of the Asian Italy, valued for their climate, sport, and scenery. The revenue given by Abul Fazl is estimated in sheep and rice, with the exception of that of Kábul Sircar which is stated at twenty lakhs. Thomas estimates the total yield at no less than 80 lakhs. The aggregate of these items amounts to a little below 10 *krors*; but they include some *Sáyar* items, though how much cannot be determined. In one or two instances in which these are stated separately, they are from 2 to 4 per cent.

Such was the territorial constitution of the Chaghtai territory till the conquests of Aurangzib. In 1694, Sr. Manucci made a fresh list of the provinces as they existed in his time; it is abstracted below, and the numbering has been brought into correspondence with the annexed sketch-map.

1.—BENGAL, without Orissa, was assessed at over four *krors* (which is three times more than in the other lists).

|                                                                                                                                                                                                                                                              |                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 2.—BAHAR, .....                                                                                                                                                                                                                                              | Rs. 1,21,50,000          |
| 3.—ORISSA (called by Manucci "Urcha"),.....                                                                                                                                                                                                                  | 57,07,500                |
| 4.—OUDH (called "Rajmahal" apparently), .....                                                                                                                                                                                                                | 1,00,50,000              |
| 5.—DIHLI, .....                                                                                                                                                                                                                                              | 1,25,50,000              |
| 6.—AGRA, .....                                                                                                                                                                                                                                               | 2,22,03,550              |
| 7.—ALLAHABAD, .....                                                                                                                                                                                                                                          | 77,38,000                |
| 8.—LAHOR, .....                                                                                                                                                                                                                                              | 2,32,05,000              |
| 9.—KABUL, .....                                                                                                                                                                                                                                              | 32,07,250                |
| 10.—AJMÍR (Rajputána, temporarily subjugated<br>and heavily assessed), .....                                                                                                                                                                                 | 19,00,000                |
| 11.—MULTÁN, .....                                                                                                                                                                                                                                            | 50,25,000                |
| 12.—MÁLWA, .....                                                                                                                                                                                                                                             | 99,06,250                |
| 13.—GUJARA'T (probably including Customs),.....                                                                                                                                                                                                              | 2,32,95,000              |
| 14.—KHA'NDES, .....                                                                                                                                                                                                                                          | 1,11,05,000              |
| 15.—BERA'R, .....                                                                                                                                                                                                                                            | 1,58,07,500              |
| 16.—GONDWA'NA (no assessment given in any list<br>but of Aurangzib's reign).                                                                                                                                                                                 |                          |
| 17.—AURUNGÁBÁD, or a part thereof, (called "Bag-<br>lana" from Bághelána a hilly tract in the<br>heart of the Mahratta country. Tallies<br>with estimates of Tavernier and Bernier,...<br>All Aurangábád or Daulatábád rated much<br>higher in native lists. | 68,85,000                |
| 18.—BIJA'PUR, .....                                                                                                                                                                                                                                          | 5,00,00,000              |
| 19.—HAIDARÁBÁD (not named by Manucci, proba-<br>bly included in "Golconda,".....                                                                                                                                                                             | 5,00,00,000              |
| 20.—BIDAI ( <i>i. e.</i> "Nanda" aggregate in other<br>lists running from 93 lakhs to over two<br><i>krors</i> ),.....                                                                                                                                       | 72,00,000                |
| Total,.....                                                                                                                                                                                                                                                  | <hr/> 31,79,35,050 <hr/> |

It will be seen that there are discrepancies, both as to names and rating, between Manucci's list and those derived from native sources. But such, just a century after the completion of Abul Fazl's record, were the collections according to a European residing at the Imperial Court in a position of trust. Mr. Thomas calls Manucci "a competent witness at head-quarters." He does not name the Subahs always as they are named in other lists that have come down to us; and he gives some names (such as "Bakar" and "Ujain" that are not found elsewhere. And he estimates the returns of some higher and those of other lower than they are usually reckoned. But it must be admitted that his aggregate tallies pretty closely

with the totals of other lists. Of these the mean is about three and a half *krors*, while his total, as we see, is nearly thirty-two; and there can be little doubt that this is near the correct figure. It is not, however, so clear what it represents in the modern figures. It is true that the Rupee of those days contained about the same quantity of silver as does that of our own days: but we have the positive testimony of Manucci that the exchange value of the Rupee in the European currency of his day was "*trente sols*," or fifteen pence. In this he is confirmed by Tavernier, who says that fourteen Rupees were worth twenty-one *livres tournois*. Manucci's total therefore would be nearly worth twenty millions sterling.

It is a farther question, whether the separate revenue was equal in amount, or nearly so? The answer seems to be that the separate revenue was derived from sources too vague and fluctuating to be so estimated. It chiefly came from escheats and fines—to speak according to European usage—and the amount must have depended upon the character of the sovereign, the longevity of incumbents, and similar things, to an extent which would make it impossible to make an approximation for any one year.

Lastly, it is to be noted that, besides the provinces named above, the Empire had, for a few years of Aurangzib's reign, a claim—more or less practically exercised—to parts of the Bálághát, and the Malabar and Coromandel Coasts. But these were never made into regularly organised Subahs, nor did they appear upon the rolls, and they soon became totally independent.

## 2. *Land and Fresh-water Shells of Kashmir.*—By W. THEOBALD. (Abstract.)

Enumerates 53 species of shells noticed by the author and 11 recorded species, in all 64; of these two are new species, *Hemiplecta Jamuensis* and *Pisidium Hydaspicola*, and a variety of *Helicarion Flemingii*, Pf. var. *altivagus*, Theob. which may possibly be entitled to specific rank when more specimens have been examined.

The PRESIDENT called attention to the importance of local lists like the present. Kashmir is a country on the borders of two great zoological regions, the Palæarctic and the Oriental, and like similar countries elsewhere, it possesses a fauna in which the distinctive forms of the two regions are blended in a very curious way. In the upper Indus valley the fauna is purely Palæarctic, but in Kashmir itself there is an admixture of Palæarctic forms with Oriental types allied for the most part to animals inhabiting the Himalayas.

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## LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,  
*presented by their respective Societies or Editors.*

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Berlin. Die Königliche Preussische Akademie der Wissenschaften,—Monatsberichte, Februar, 1878.

Bombay. The Indian Antiquary,—Vol. VII, Pts. 81 and 82, June and July, 1878.

Pt. 81. *E. Buhler*.—The three New Edicts of As'oka.

Pt. 82. *J. F. Fleet*.—Sanskrit and old Canarese Inscriptions, Nos. XL and XLI. *E. C. G. Crawford*.—Personal names in the Southern part of the Ahmadábád Collectorate and neighbouring country. *L. Rice*.—Chera or Gañga grants of A. D. 350 and 481. *M. J. Walhouse*.—Archæological Notes, No. XX.

Calcutta. The Indian Forester,—Vol. III, No. 3, January 1878.

———. Records of the Geological Survey of India,—Vol. XI, Part 2, 1878.

*W. T. Blanford*.—On the Geology of Sind. *V. Ball*.—On the origin of the Kumaon Lakes. *T. W. H. Hughes* and *Dr. Waagen*.—Note on a trip over the Milam Pass, Kumaon. *F. R. Mallet*.—The mud Volcanoes of Rámri and Cheduba. *F. R. Mallet*.—On the Mineral resources of Rámri, Cheduba, and the adjacent Islands.

———. The Mahabharata,—No. 23.

Cambridge. Museum of Comparative Zoology,—Bulletin, Vol. V, No. 1.

Florence. Società Toscana di Scienze Naturali,—Processi verbali, Maggio 1878.

London. The Athenæum,—Nos. 2638, 2639, 2640 and 2641, May, June 1878.

———. The Geographical Magazine,—Vol. 5, No. 5.

———. Nature,—Vol. 18, Nos. 446, 447 and 449.

———. The Royal Society,—Proceedings, Vol. 27, No. 186.

*J. S. Lombard*.—Experimental Researches on the Temperature of the Head. *Dr. Tyndall*.—Recent experiments on Fog-Signals. *Gustav Bischof*.—On putrescent Organic matter in Potable Water. *B. T. Lowne*.—On the modifications of the Simple and Compound Eyes of Insects. *W. Turner*.—On the Placentation of the Apes with a comparison of the Structure of their Placenta with that of the Human Female.

London. Royal Astronomical Society,—Monthly Notices, Vol. 38, No. 5.

*Mr. Stone.*—On the Telescopic Observations of the Transit of Venus 1874, made in the expedition of the British Government, and on the conclusions to be deduced from those Observations. *Mr. Eerek.*—Improvements in a Solar Spectroscope, made by Mr. Grubb for Professor Young. *Capt. Tupman.*—Notes on the Mean Solar Parallax as derived from the Observations of the recent Transit of Venus.

———. Royal Institution of Great Britain,—Proceedings, Vol. 8, Parts 3 and 4, Nos. 66 and 67, and a List of Members.

No. 67. *Richard Strachey.*—Physical causes of Indian Famines. *Prof. Tyndall.*—Putrefactive and Infective Organism from Physical Point of View.

Lyon. Société de Géographie,—Bulletin, No. 9, Janvier 1878.

Roma. R. Accademia dei Lincei,—Atti., Vol. 2, Fasc. 5°, Aprile 1878.

St. Petersburg. Société Impériale Russe de Géographie,—Séance mensuelle, Avril 1878.

———. Records of the Imperial Russian Geographical Society, 1877.

### PERIODICALS PURCHASED.

Bombay. Medical and Physical Society,—Transactions, Vol. 2, Nos. 3 to 10. (*New Series*) Nos. 1 to 11.

———. The Vedārthayātna, or an attempt to interpret the Vedas,—No. 16, Pt. II, March 1878.

Bordeaux. Société de Géographie Commerciale,—Bulletin, Nos. 9 to 11, (*2nd Série*) Mai et Juin 1878.

Calcutta. The Indian Medical Gazette,—Vol. XIII, No. 6.

Cambridge. The Messenger of Mathematics,—No. 84, April 1878.

Göttingen. Göttingische Gelehrte Anzeigen, Stück 19 to 21, 1878.

———. ———. Nachrichten,—No. 7, 1878.

Leipzig. Annalen der Physik und Chemie,—Band 3, Heft 4, No. 4, Band 4,\* Heft 1, No. 5, and Band 2, Stück 5, No. 5, 1878.

Band 4.\* *E. Lommel.*—Theorie der Doppelbrechung.

London. The Academy,—Nos. 315-318, 1878.

———. The Chemical News,—Vol. 37, Nos. 964-967.

No. 964. *Prof. Hughes.*—On the action of Sonorous Vibrations in varying the Force of an Electric Current. *S. Kern.*—On the Chemical and Mechanical Analyses of Cast-Steels.

No. 966. *G. R. Tweedie.*—A process for coating Iron with Magnetic Oxide by the Action of Heated Air. Improvements in the Method of Preserving Animal and Vegetable Food. On Indigo-Blue from *Polygonum tinctorium* and other Plants.



London. The Edinburgh Review,—No. 302, April 1878.

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The Princes of India and the Proclamation of the Empire.

———. The Entomologist,—Vol. 11, No. 180.

———. The Entomologist's Monthly Magazine,—Vol. 14, No. 163.

———. The Ibis, 4th Series,—Vol. 2, No. 6, 1878.

*W. Ramsay.*—A Synopsis of the Genus *Pomatorhinus*. Plates III and IV.

———. The Journal of Botany,—Vol. 7, No. 185, 1878.

*M. Moore.*—Alabastra Diversa.

———. The London, Edinburgh, and Dublin Philosophical Magazine,—Vol. 5, No. 32.

*R. Mallet.*—Rate of Earthquake-wave Transit. *Dr. L. Bleekrode.*—On the Electric Conductivity and Electrolysis of Chemical Compounds.

———. The Annals and Magazine of Natural History,—Vol. 1, No. 5.

*A. G. Butler.*—Description of New Species of *Heterocera* from Japan. Part 3, *Geometrites*.

———. Journal of the Society of Arts,—Vol. 26, Nos. 1330-1333, 1878.

No. 1330. *R. M. Gover.*—Dietaries, in their Physiological, Practical, and Economic Aspects.

No. 1331. *F. C. Danvers.*—Agriculture in India. *F. J. Ritchie.*—Controlling and Correcting Clocks by Electricity.

———. The Nineteenth Century,—No. 15, 1878.

———. The Westminster Review,—No. 106, April 1878.

Popular Buddhism according to the Chinese Canon. An Indian District: Its People and Administration.

———. Reeve's Conchologia Iconica,—Pts. 340-341.

New Haven. The American Journal of Science and Arts,—Vol. 15, No. 88, 1878.

*A. M. Mayer.*—Experiments with Floating Magnets. *S. P. Langley.*—Janssen Solar Photograph and Optical Studies.

Paris. Comptes Rendus,—Tome 86, Nos. 18-21, 1878.

No. 20. *M. A. Lery.*—Sur la recherche de l'ozone dans l'air atmosphérique.

———. Revue des Deux Mondes,—Tome 27, 48<sup>e</sup> Année, 2<sup>e</sup> Liv, and Tome 27, 48<sup>e</sup> Année, 3<sup>e</sup> Liv. 1878.

———. Revue Scientifique,—Nos. 45-49.

———. Revue Critique,—Nos. 19-22, 1878.

No. 19. *Garcin de Tassy.*—La Langue et la littérature hindoustanie en 1877.

No. 22. Eleven land-grants of the Chaulukyas of Anhilvād. A contribution to the history of Gujarât.

### MISCELLANEOUS PRESENTATIONS.

MACKENZIE, F. J. M. Routes in Asia, Section II. Rl. 8vo., Calcutta, 1878.

FAWCETT, R. H. Routes in Asia, Sec. III. Rl. 8vo., Calcutta, 1878.

MACGREGOR, C. M. Routes in Asia, Sec. IV. Rl. 8vo., Calcutta, 1878.

SAWARD, M. H. Routes in Asia, Sec. V. Rl. 8vo., Calcutta, 1878.

BROWNRIGG, H. S. Routes in Asia, Sec. VI. Rl. 8vo., Calcutta, 1878.

#### THE QUARTER-MASTER GENERAL'S DEPARTMENT.

LETHBRIDGE, A. S. Administration Report on the Jails of Bengal, for 1877. 4to., Calcutta, 1878.

A. S. LETHBRIDGE.

METCALFE, C. T. Annual Report on the Police Administration of the town of Calcutta and its Suburbs, for 1877. 4to., Calcutta, 1878.

C. T. METCALFE.

LOTH, Q. A Catalogue of the Arabic Manuscripts in the Library of the India office, (2 copies). 4to., London, 1877.

#### GOVERNMENT OF INDIA, HOME DEPARTMENT.

Report on the Gaols of the Central Provinces, for 1877.

Report on the Police Administration of the Central Provinces for 1877.

Report on the Lunatic Asylums in the Central Provinces for 1877.

Report on the working of the Government Charitable Dispensaries in the Central Provinces for 1877.

#### CHIEF COMMISSIONER, CENTRAL PROVINCES.

Selections from the Records of the Madras Government, No. LXIII, for 1876-77. 8vo., Madras, 1878.

#### GOVERNMENT OF MADRAS.

TAYLOR, A. D. General Report on the operations of the Marine Survey of India for 1876-77. 4to., Calcutta, 1878, (2 copies).

COMMANDER A. D. TAYLOR.

### BOOKS PURCHASED.

BRANER, F. Reise der Oesterreichischen Fregatte Novara, Zoologischer Theil, Heft 2. 4to., Wien, 1866.

FELDER, R. and ROGENHOFER, A. F. Reise der Oesterreichischen Fregatte Novara; Zoologischer Theil, Heft 4. 4to., Wien, 1874.

———. ———. Reise der Oesterreichischen Fregatte Novara; Zoologischer Theil, Heft 5. 4to., Wien, 1875.

FORREST, JAS. Minutes of Proceedings of the Institution of Civil Engineers, with other selected papers, Vol. LI, Pt. I, Session 1877-78. London, 1878.

GOULD, J. Birds of Asia, Pt. XXX. folio, London, 1878.

———. Birds of New Guinea, Pts. V, VI. London, 1877-78.

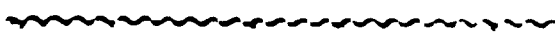
LOCKYER, J. N. Studies in Spectrum Analysis. 8vo., London, 1878.

MAYR, DR. G. L. Reise der Oesterreichischen Fregatte Novara: Zoologischer Theil, Heft 5. 4to., Wien, 1866.

SCHNEER, DR. J. R. Reise der Oesterreichischen Fregatte Novara: Zoologischer Theil, Heft 4. 4to., Wien, 1868.

WRIGHT, WM. Facsimiles of Ancient Manuscripts, etc., Pt. II. folio, London, 1877.

ZUCKERKAUDL, DR. E. Reise der Oesterreichischen Fregatte Novara: Anthropologischer Theil. 4to., Wien, 1875.



**PROCEEDINGS**  
**OF THE**  
**ASIATIC SOCIETY OF BENGAL.**  
**FOR AUGUST, 1878.**

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The Monthly General Meeting of the Asiatic Society was held on Wednesday, the 7th Instant at 9½ o'clock P. M.

W. T. BLANFORD, F. R. S., President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the Secretary to the Bengal Government.

Report of the Jails of Bengal, 1877. By A. S. Lethbridge, Esq.

2. From the Madras Government, Report on the Administration of the Madras Presidency for 1876-77; and Report of Vaccination.

3. From the Chief Commissioner, Central Provinces, Report of the Registration Department.

4. From Captain W. Clarke, the author,—a Persian Manual.

5. From Capt. A. D. Taylor, Charts of the Singora Roads.

6. From O. Böhtlingk, the author,—a Sanskrit Chrestomathie.

7. From L. H. Mitchell, Esq., the author,—Report on the Seizure by the Abyssinians of the Geological and Mineralogical Reconnaissance Expedition attached to the General Staff of the Egyptian army.

8. From the Under-Secretary to the Government of India,—one Gold and two Silver Coins, found at Baroda.

The following Gentlemen, duly proposed, and seconded, at the last Meeting, were ballotted for, and elected Ordinary Members.

1. Pierce DeLacy Henry Johnstone, Esq., B. C. S., M. A. of Balliol College, Oxford, formerly Taylorian and Boden University Scholar.

2. Major T. H. Lewin, re-elected.

3. Dr. E. Laurie.

The following are candidates for ballot at the next meeting.

1. A. H. Anthony, Esq., Asst. to Contr.-Genl., Financial Department, proposed by H. K. W. Arnold, Esq., seconded by H. B. Medlicott, Esq.
2. R. Whittall, Esq., Forest Department, British Burmah, proposed by Dr. G. King, seconded by W. T. Blanford, Esq.
3. The Right Rev. Bishop of Rangoon, proposed by W. T. Blanford, Esq., seconded by T. S. Isaac, Esq.
4. P. C. Wheeler, Esq., C. S., Asst. Magistrate, Ghazipore, proposed by H. Rivett-Carnac, Esq., seconded by H. B. Medlicott, Esq.

The SECRETARY announced that Capt. C. H. Cowan had intimated his desire to withdraw from the Society.

The PRESIDENT announced the death of Mr. Henry Blochmann, Philological Secretary to the Society, and said—

We miss from amongst our number to-night, one who has for so long been a most prominent and valuable member, one to whom we have so often listened with pleasure, and who has added so greatly to the welfare of the Society, that it will be long before we shall be able to reconcile ourselves to the loss we have sustained.

It would be impossible for me to express adequately all that we have lost in Mr. Blochmann; there is no member who has worked more earnestly, more energetically, or more constantly for our Society, no one who has equal experience as an officer, no one whose death could have inflicted a greater blow to the progress of the work in which we are all interested. In every department of the Society's affairs; in the editing of our publications, in the conduct of our correspondence, in the supervision of our finances, in the arrangement of our Library, a foremost part, and very frequently the principal labour, was cheerfully taken by our late Philological Secretary, and his death has left us simply unable to replace him. Apart from his high merits as an Oriental Scholar and his energetic participation in the Society's affairs, he was beloved and esteemed by all who knew him, for his kindly manner and his willingness on all occasions to undertake any task that was necessary. Heartily good-natured, thoroughly independent, and with true German love of hard work, he could equally be depended upon for an honest original opinion on any subject that came before us; and for any labour that might be necessary for the Society.

It has been said very often, and the fact cannot be repeated too frequently, that the well-being and usefulness of this Society depend chiefly upon its Secretaries. Very few indeed have held the post so long as Mr.

Blochmann, who has been Philological Secretary of the Society for nearly 11 years. It is unnecessary that I should give you any detailed account of the work he has done in the meantime, nor should I be competent to do so if it were necessary ; I must leave the task to those who are more conversant with Oriental literature. The Journal and Proceedings of the Society, crowded with Mr. Blochmann's contributions, answer for him, and it is impossible that any member needs to be reminded of the value of our late Secretary's labours. Mr. Blochmann's studies, as you are all doubtless aware, embraced a wide circle of Arabic and Persian literature, but his especial study, the subject on which he had probably acquired more knowledge than has ever been attained by any other European, or perhaps even by any native of India, was the History of India under the Muhammadan rule. On all subjects relating to Muhammadan India the extent and accuracy of his knowledge was something wonderful ; and he spared no effort to obtain fresh information. Manuscripts, inscriptions, coins,—all records of the times,—have been noticed by him frequently and fully in the Journals and Proceedings of the Society. His death in the midst of his career and in the prime of life has deprived the world of a mass of information as to the history of this country, information which is not likely to be again attained for a long time to come by any single individual. His most important work, the translation of the *Ain-i-Akbari*, has unfortunately been left incomplete.

All these writings are before the world, but a large amount of work falls upon our Secretaries, and is entirely unrecorded ; indeed it is as a rule only known to members of the Council. I will mention but one instance of Mr. Blochmann's labours. For the last ten or twelve years a catalogue of the Society's Library has been a most urgent want. Attempt after attempt has been made to prepare one, but all have failed, because no officer of the Society, who possessed the requisite knowledge, could afford the time, and was willing to give the very large amount of supervision necessary. The difficulty is due to the great number of languages represented, and the wide range of subjects treated in the books contained in the Society's Library. At length last year the task was undertaken by Mr. Blochmann, and under his superintendence, and in a very great measure by his personal labour, a complete list of the books has at length been made, and if, as I hope, something like an accurate Catalogue is published in the course of the next few months, the members of this Society will be indebted to Mr. Blochmann alone for the boon they will obtain.

The following is a brief sketch of our late friend's career. He was born at Dresden on the 7th January, 1838, and was first educated at

the Kreuz-Schule of that city. From 1855 to about September 1857, he studied Hebrew and Oriental languages at the University of Leipzig under Professor Fleischer. He afterwards studied for a short time in Paris, and in 1858 he left Europe for India, being chiefly induced to this step by his love for oriental studies, and he landed in Calcutta, nearly 20 years ago, in September, 1858. At first he appears, for want of employment, to have been reduced to great straits, and he at one time enlisted in the army, but he soon found a friend in Captain Nassau Lees, then Principal of the Calcutta Madrassa, by whose assistance Mr. Blochmann was appointed to a subordinate post in the Madrassa College in 1860. He left this post in the beginning of 1862 to become Professor of Mathematics at the Doveton College, a post he held for about three years. He studied meantime energetically, and in 1865 took the degree of Master of Arts in the Calcutta University, having chosen Hebrew as the subject for his examination. It is related that when, after some difficulty, examiners were found competent to decide upon his proficiency, they found the student was far better acquainted with the language than they were themselves. In the same year Mr. Blochmann rejoined the Madrassa as Assistant Professor, Captain Nassau Lees remaining as the Principal until 1869, when he retired, and at first no successor was appointed, but a committee exercised supervision, whilst Mr. Blochmann was placed in charge of the College, retaining his title of Professor. He was appointed to officiate as Principal in 1870 and was made Principal in 1875. How, in the course of the time that he has held the office, he has endeared himself to the Students of the College and to the whole Muhammadan community, is shewn by the general sorrow for his death and by the Muhammadan meeting of last week to do honour to his memory.

Mr. Blochmann joined the Society in 1864 and entered the Council, when he became Secretary in succession to Mr. Heeley, in 1868. He retained the office until his death. He had been ailing slightly for about a month, and although, as all may remember, the most regular of attendants at our monthly Meetings, he was absent on the last occasion in July. Still no danger was suspected, he was supposed to be suffering from a slight attack of fever, and he had made arrangements to leave Calcutta for a short time and go to Dalhousie.

Only three or four days before his death, was there any suspicion of the real cause of his illness, renal disease, and even then no acute symptoms presented themselves. On the very day when he had proposed to leave Calcutta his illness increased, and the next morning he was found



to be suffering from severe uræmic poisoning. He fell into an unconscious state about midday, and died three hours afterwards.

The Council of the Society desire to preserve some Memorial of our late Secretary, in recognition of the valuable services rendered by him, for so many years, to the Society and to Oriental Literature. A Committee has been appointed to consider the best means of carrying out this project, and it has been determined to apply to the Members of the Society and to Mr. Blochmann's other friends for subscription towards a memorial bust or portrait.

I have only to add in conclusion, that I propose, with the consent of the Members present, as a tribute of respect to our late Secretary, to close the present meeting and to take as read such papers as remain for consideration. I would also suggest that an expression of our sorrow, and sympathy with their loss, should be sent to Mr. Blochmann's widow and family.

The PRESIDENT announced, in consequence of the death of Mr. Blochmann, that Mr. C. H. Tawney had been appointed Member of Council and Philological Secretary.

The PRESIDENT announced that Mr. E. Gay had resigned his office as Member of Council and Treasurer to the Society in consequence of his departure from Calcutta, and that Mr. H. Beverley had been appointed in his place.

## LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

### TRANSACTIONS, PROCEEDINGS AND JOURNALS, *presented by the respective Societies or Editors.*

Baltimore. Mathematics, pure and applied,—Journal, Vol. 1, No. 1.

Batavia. Natuurkundig Tijdschrift voor Nederlandsch—Indië,—Deel 37.

Belgique. Société Géologique,—Annales, Tome II, III, 1874-75, 1875-76.

Berlin. Königlich Preussische Akademie der Wissenschaften,—Monatsbericht, März und April, 1878.

Calcutta. The Indian Forester,—Quarterly Magazine, Vol. 3, No. 14, April 1878.

*Kad Handi*.—Notes on Sandal. *B. H. B. P.*—On some of the Results of Forest Meteorological Observations. *W. T. T. Dyer*.—The Rain-Tree of Moyobamba. *Dr. R. Schomburgk*.—South Australian Eucalypts.

———. The Mahábhárat,—Vol. 5, Fasc. 24.

———. The Yajurveda Sanhita,—Vols. 30-33, 1878.

———. Geological Survey of India,—Records, Vol. 11, Pts. 1 and 2.

Part 1. Annual Report of the Geological Survey of India, and of the Geological Museum, Calcutta, for 1877. *R. Lydekker*.—Notes on the Geology of Kashmir, Kishtwar, and Pangi. Notices of Siwalik Mammals. *W. T. Blanford*.—The Palæontological relations of the Gondwana System. A reply to Dr. Feistmantel. *A. B. Wynne*.—On "Remarks &c., by Mr. Theobald upon Erratics in the Punjab."

Part 2. *W. T. Blanford*.—On the Geology of Sind, (2nd Notice). *V. Ball*.—On the Origin of the Kumaun Lakes. *F. R. Mallet*.—The Mud Volcanoes of Rámri and Cheduba.

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No. 2. *A. F. Mehren*.—Description d'une médaille mongole d'Abou-Saïd Béhâdur Khan de la dynastie Ilkhanienne.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR NOVEMBER, 1878.

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The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 6th instant, at 9 o'clock P. M.

W. T. BLANFORD, F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced :—

1. From H. E. the Viceroy and Governor-General, J. Talboys Wheeler's History of the Imperial Assemblage at Delhi.

2. From the author, W. T. Blanford, Esq., Scientific Results of the Second Yarkand Mission. Geology.

3. From the author, Babu Adharlal Sen, Kusum-Kánan.

4. From the author, Babu Rajendra Nath Dutt, The Bharatya Granthabali.

5. From E. Linstedt, Esq., Lieut. Hawkes' Coins of Mysore.

6. From the author, F. V. Hayden, Esq., Report of the United States Geological Survey of the Territories; also Jackson's Descriptive Catalogue of Photographs of North American Indians.

The following gentlemen, duly proposed and seconded at the last Monthly General Meeting and Council Meetings of September and October, were ballotted for and elected Ordinary Members—

A. H. Anthony, Esq.

R. Whittall, Esq.

P. C. Wheeler, Esq.

The Right Rev. the Bishop of Rangoon.

S. G. Hughes, Esq., C. S.

T. D. Beighton, Esq., C. S.

The Rev. J. Robertson.

The Hon'ble J. Sewell White.



The following are candidates for ballot at the next meeting—

1. Rajah Lachman Singh, Deputy Collector, Bullundshahar, proposed by F. S. Growse, Esq., seconded by Dr. Rudolf Hoernle.

2. Babu Krishna Gopal Bhakta, proposed by Babu Adharlal Sen, seconded by Dr. R. L. Mitra.

The SECRETARY announced that Major Lewin and Mr. J. Murray had requested that their election might be cancelled.

The SECRETARY announced that Mr. C. Pearson and Mr. C. A. Elliott, had intimated their desire to withdraw from the Society.

The SECRETARY announced that the Rev. Dr. A. F. Rudolf Hoernle had been appointed Philological Secretary, in the room of Mr. C. H. Tawney, who had conducted the duties temporarily.

The SECRETARY read a notice of a prospectus received from Dr. Barth, of a new Chart of the Moon, to be published in 25 Sections, by W. G. Lohrmann.

Mr. Joh. Ambr. Barth of Leipzig has sent the prospectus of a new chart of the moon, by W. G. Lohrmann. The chart consists of 25 Sections with two tables of explanations. There is added to it a descriptive text by Dr. J. F. Julius Schmidt, Director of the Observatory in Athens. The price is £2 10s.

The chart was begun by Lohrmann in 1821. The first part was published in 1824. In 1840 Lohrmann died, and for some years the work remained in abeyance. But in 1851 Dr. J. Schmidt was prevailed upon by the publisher, W. A. Barth, and after his death, his son F. A. Barth, to continue it with the assistance of W. Opelt of Dresden, and after his death (1863) of his son, Lieut. Opelt. At last the work was finished in 1874. To the chart will be added a text, describing its method; also a catalogue of all selenographic positions calculated by Opelt. There will be a brief explanation of each section, in which the more important differences of height will be noted, and all remarkable points noticed. The principal merit of the work lies in Lohrmann's *drawing*, which closely resembles that of Maedler's famous chart. His object was, to represent as faithfully as possible the mountains and the colour of the moon, and to execute the measurements and drawings according to methods approved of by science. Accordingly he chose the orthographic projection of the visible hemisphere of the moon and the mean libration, drew the mountains according to Lehmann's method, and without indications of their varying illumination. Owing to the long delay in the execution of the work, there is a noticeable want of uniformity in the colouring of the plates. Maedler's chart is much more satisfactory in this respect.

Mr. MALLEY exhibited a Meteorite, forwarded to the Indian Museum by Hugh Fraser, Esq., from Gorakhpur.

The two meteoric stones now exhibited fell near Dandapur (Lat.  $26^{\circ}$ ,  $56'$  N., Long.  $83^{\circ}$ ,  $58'$  E.), a village 5 miles W. N. W. of the town of Pudrownan, in the Gorakhpur district, on the evening of the 5th of September last, and were forwarded to the Indian Museum by Mr. Hugh Fraser, Assistant Magistrate of Gorakhpur, with all the information he could procure respecting the occurrence, which is as follows: "About 5 P. M. some people in the villages of Barchua and Dandapur saw what they describe as a wedge-shaped cloud coming up from the north-east. It advanced from that direction, and seemed to descend, and then there was a noise like thunder. They say their eyes closed, but it is not clear from the wording whether on account of a flash, or on account of fear. The fragments fell—one through the house of Salámdari; one in a field on the boundaries of the neighbouring village Sirsa, about 300 paces distant from the first, and another, not yet recovered, in a tank. In the two first places a hole was made in the ground about a span in depth and a cubit in diameter; there was some delay in digging out, and when taken out, the stones were not warm."

According to the above account, the fragments fell at a distance of some 300 paces from each other. It will be observed, notwithstanding, that on the fractured faces they fit each other exactly, the two forming the halves of a single stone, which prior to its fracture was covered entirely by the usual brownish-black crust. The larger fragment weighs about 6 lbs. 9 oz., and the smaller about 5 lbs. 14 oz., the two together forming an irregular, somewhat wedge-shaped mass, measuring about 7 inches by 7, with an average thickness of about 3 inches, but thinning off considerably towards one side. The specific gravity of the larger piece was found to be 3.29.

On a fresh fracture, the meteorite is seen to consist of a minutely crystalline white mass, composed of translucent grains of one or more silicates, through which specks with metallic lustre are plentifully distributed. Most of these are small, so that they are distinctly visible only under the lens, but others are of larger dimensions, one or two being about an eighth of an inch in diameter. The greater number of these are troilite or pyrrhotite, but a considerable proportion are of nickeliferous iron. The occurrence of phosphorus, also, seems to indicate the presence of schreibersite. On the faces of original fracture the meteorite presents an ochry mottling due to the oxidation of the iron; but there is no sign of the crust that covers all the rest of the surface. In this connection it will be interesting to notice whether the third piece, if it can be recovered, should appear to have been originally united to these.

The following papers were read—

1. *Some further notes on Kālidāsa.*—By G. A. GRIERSON. B. C. S.  
(Abstract.)

This paper contains some legendary traditions current in Behār, concerning the famous poet Kālidāsa, who was born at Dāmodarpur, a village near the town of Achait in Tirhut. They are all chiefly illustrative of his great powers of improvisation. The first legend narrates a story of his youth ; how being at first little better than an idiot, he afterwards came to be possessed of his unrivalled power over the Sanskrit language by the special interposition of the goddess Durgā. The second legend is an amusing story about Kālidāsa at the court of Rājā Sibhai Singh. This Rājā was a great patron of paṇḍits ; but he was wont to regulate his patronage not by their learning, but by their weight. Kālidāsa being a small lean man, persuaded a fat and unwieldy shepherd to accompany him and personate his *guru*, promising that he would do all the talking, while the shepherd should never utter a word. The ruse succeeded. The shepherd was installed as chief paṇḍit at the Rājā's court, and Kālidāsa as his disciple. One day, however, the shepherd forgot himself and spoke a word in his vulgar idiom in the presence of the king and his court. Kālidāsa, with great presence of mind, composed a verse on the spur of the moment, in which he made an ingenious defence of his *guru's* blunder. This, of course, did not save the shepherd, but made Kālidāsa famous throughout the three worlds. The third legend relates to the manner in which Kālidāsa procured his admission to the court of king Bhoja, by first simulating gross ignorance and afterwards confounding the king's chief paṇḍit by a sudden display of his remarkable power in composing extempore verses in Sanskrit. The fourth legend relates an incident at king Bhoja's court ; how Kālidāsa by means of some ingeniously worded verses outwitted three paṇḍits, who through their great powers of memory had hitherto confounded all claimants to the king's favour. The fifth legend relates how in the early years of his ignorance Kālidāsa conciliated his wife, who was a learned woman and acted to him the part of a Xanthippe, by his miraculously acquired knowledge. The sixth legend tells of a narrow escape of Kālidāsa from the clutches of a man-devouring *pisācha* by his gift of improvising verses. The next two legends relate two other incidents at the court of king Bhoja, which also illustrate the ready power of Kālidāsa of composing Sanskrit verse on the spur of the moment. Then follows a legend, showing how Kālidāsa used to do his marketing in improvised Sanskrit verse. The series concludes with a legend, giving a conversation between Kālidāsa and his wife in extempore verses during a morning walk by the side of a tank covered with lotuses.

A few, hitherto apparently unknown, Sanskrit verses in praise of contentment are added, which are universally attributed to Kálidása in that part of the country.

In conclusion, Mr. Grierson promises to communicate at some future time similar legendary accounts of other famous heroes and heroines of Mithilá.

The paper will be published in the Journal, Part I.

2. *Description of a new Lepidopterous Insect belonging to the Genus Thaumantis.*—By J. WOOD-MASON.

(Abstract.)

This paper contains additional remarks on the fine butterfly collected by Mr. Ossian Limborg in the Tao mountains of Tenasserim and described in the 'Proceedings' for July, 1877, p. 163. In the collection made by Mr. Limborg were 225 other species of *Lepidoptera*, from fifty to sixty of which are undescribed.

Both the specimens of the new species, *Thaumantis Louisa*, are males, and each is furnished with a tuft of erectile hairs on the hind wing. It is suggested that these may be odoriferous organs, like similar tufts on the different parts of the body in the males of some Brazilian butterflies.

The paper is accompanied by a plate from a characteristic coloured drawing by Professor Westwood.

The paper will be published in the Journal, Part II.

3. *On the Diurnal Variations of Rainfall-frequency at Calcutta.*—By H. F. BLANFORD, F. G. S., F. Z. S.

(Abstract.)

A table is given of the occurrence of rain at each hour of the day in each month of the year, merely the fact of occurrence and not the amount of rainfall being noted. It is shewn that the proportion of rain falling at different hours of the day varies with the season. In the summer monsoon the smallest rainfall is at midnight, the greatest about 2 P. M., the time of maximum temperature. In the dry and hot season, February to May, the maximum rainfall is between 6 and 8 P. M. owing to the evening storms. In October and November the rainfall appears to have a similar distribution to that prevailing in the rains. In December, the recorded falls are too few in number to lead to any conclusion, but in January, the period of the winter rains, the maximum rainfall appears to coincide with the period of minimum temperature in the early morning.

The paper will be published in the Journal, Part II.

4. *Snow-fall of 1878, in Kashmir.*—By R. LYDEKKER.

(Abstract.)

This was a short paper on the unusual snow-fall of the past winter in the Kashmir Himalayas; the author mentioned that many of the passes were still blocked with snow in the late summer, and also referred to the great destruction of animal life caused by this unusual quantity of snow.

Mr. BLANFORD said that the excessive snow-fall referred to by Mr. Lydekker, seemed to have prevailed throughout the outer Himalayas, and suggested that this might have been the cause of the comparatively low temperature observed in India during the last hot season.

Dr. CAYLEY observed that there was a great variability at the time of the autumn snow-fall; he had crossed the Zogi-la in December, when it was still free from snow, while in other years it was thickly covered at a much earlier period.

The paper will be published in the Journal, Part II.

5. *A New Prākṛit Grammar by Chaṇḍa.*—By DR. A. F. RUDOLF HOERNLE.

The Prākṛit Grammar which I have the pleasure to exhibit to the Society to-night, was given to me a few months ago by my friend, Paṇḍit Rām Misra of Banaras. It came originally from some place in the State of Alwar. There is at present, I believe, only one other copy of this work known. It is in the possession of Dr. Rājendralālā Mitra, and is, as I am informed by him, not complete. I have not seen it myself. The copy, in my possession, has every appearance of being a complete one; for it contains rules on all the various forms of Prākṛit (including the Apabhraṃṣa) which are usually treated of in Prākṛit Grammars.

My MS. closes with the usual formula, containing the name of the work and of its author. The name of the latter is simply *Chaṇḍa* (चण्ड). That of the former is variously given. At the end of the whole work, and of the first chapter it is simply *lakṣhaṇa*, “characteristic” or “mark”; at the end of the second chapter it is *prākṛita lakṣhaṇa* “Prākṛit characteristics”; at the end of the third chapter it is *prākṛita prakāśa* “elucidation of the Prākṛit”; the latter being the same name, which also Vararuchi’s well-known Prākṛit Grammar bears.

The work is perhaps the shortest that I have met with on Prākṛit Grammar. The whole of it is contained on 19 leaves. It is divided into four chapters. The first chapter is on *declension* (*vibhaktividhānam*). It contains 45 rules, and treats of the declension of nouns, pronouns and numerals. Most of the rules throughout the Grammar have a short com-

mentary, and all of them have typical examples added. The second chapter is called *svaravidhānam*. Accordingly it ought to treat of the changes of vowels; but more than half of it consists of rules on other subjects. First there are 14 rules on vowel changes; then follow rules on the interchange of cases, on peculiar Prākṛit suffixes and particles, and, finally, even one on the change of the consonant *n* to *ḍ*. Altogether there are 45 rules. The third chapter treats of the changes of consonants, both single and conjunct (*vyañjanavidhānam*). It contains 41 rules. The fourth chapter treats of the secondary Prākṛit dialects in the following orders—the Apabhraṃṣa, the Paisāchī, the Magadhī or, as it is called in this Grammar, Māgadhikā, lastly, the Śaurasenī. To each of these dialects only one rule is devoted. In conclusion, one more rule is added. It contains a *śloka*, enumerating six languages (*bhāshās*) as well known ones, viz., Sanskrit, Prākṛit, Apabhraṃṣa, Paisāchī, Magadhī, Śaurasenī. The whole chapter therefore, consists only of 5 rules.

This Grammar has some very striking peculiarities in which it differs, I believe, from all other Prākṛit grammars. One is, that it commences with the rules on declension, while all others begin with those on vowel-changes. Again the rules on the particles, which are here added on to the chapter on vowels, are in the grammar of Hema Chandra and others which follow his arrangement, appended to the chapter on consonants, while in Vararuchi and the grammars of his class they have a separate chapter allotted to them. Again the order of the subordinate Prākṛit dialects is here reversed, the Apabhraṃṣa preceding the others, while in the other grammars (Hema Chandra, *e. g.*) it comes last. Barring the Apabhraṃṣa, however, Chaṇḍa follows the order of Vararuchi who has Paisāchī, Magadhī, Śaurasenī, not that of Hema Chandra, who takes them in the reversed order, Śaurasenī, Magadhī, Paisāchī. Again it is remarkable that Chaṇḍa has no separate rules on conjugation. So far as he adverts to conjugational forms at all, they are explained under the rules treating of changes, vowels and consonants. Again the most curious peculiarity, perhaps, is that the famous rule of the Paisāchī dialect, which substitutes hard for soft consonants (*e. g.*, *rāchā* for *rājā* king), is given by Chaṇḍa (3, ii) as an ordinary rule of the principal Prākṛit dialect (the so-called Mahārāshtrī). This fact, by the way, will explain the apparent meagreness of Chaṇḍa's chapter on the subordinate dialects, as compared with other grammars. This meagreness, I do not think can be taken as an indication of incompleteness of the MS. For though only *one* rule is devoted to each dialect, yet that rule relates to the most striking peculiarity of each. The omission of the other rules, therefore, appears to have been original and intentional. There are, besides, a great number of minor peculiarities. It would take too long, however, to mention them here.

As regards the relation of Chaṇḍa to other Prākṛit grammarians, chronologically and otherwise, I have not met with any certain indications. A more thorough investigation may, perhaps, bring to light some. Two rules I have discovered (Chaṇḍa 2, 3, 4) which are almost identical with two rules of Hema Chandra (1, 8, 6); but while in the latter they are in their proper order, they do not appear to be so in the former, (where they ought to be 2, 4, 3). This fact seems to indicate, that Chaṇḍa was acquainted with Hema Chandra's grammar, the rules of which he occasionally made use of in his own way. I have discovered only one rule in Chaṇḍa (*viz.*, 2, 3), the equivalent of which does not exist in Hema Chandra's great grammar. But on the whole, Chaṇḍa's small grammar covers the whole of the ground occupied by Hema Chandra's large work. Some things are expressed more concisely, many more of minor importance are omitted altogether. This will explain the smallness of the size of the work as compared with the extent of the ground occupied by it. On the other hand, there are some points, as *e. g.*, the order of the subordinate dialects, which seem to show that Chaṇḍa was acquainted with and occasionally followed, the school of Vararuchi. Still the peculiarities of Chaṇḍa are sufficiently numerous and striking, to justify us in vindicating for him a place of his own among Prākṛit grammarians.

The reading of the following paper was postponed.

6. *A peculiarity of the River names in Assam, and some of the adjoining countries.*—By S. E. PEAL.

## LIBRARY.

The following additions have been made to the Library since the Meeting held in August last.

## TRANSACTIONS, PROCEEDINGS AND JOURNALS, *presented by the respective Societies or Editors.*

Berlin. Königliche Preussische Akademie der Wissenschaften,—Monatsbericht, Mai und Juni, 1878.

Bombay. The Indian Antiquary,—Vol. VII, Parts 83, 84, 85, August, September and October, 1878.

Pt. 84. *J. F. Fleet.*—Sanskrit and old Canarese Inscriptions, Nos. XLIV and XLV. *Rev. G. U. Pope.*—Notes on the Kural of the Tamil Poet Tiruvalluvar. *Sir Walter Elliot.*—The edifice formerly known as the Chinese or Jaina Pagoda at Negapatam.

Pt. 85. *J. F. Fleet.*—Sanskrit and old Canarese Inscriptions, Nos. XLVI and XLVII. *J. Jacobi.*—The Kuṇḍa Inscriptions.



Boston. Society of Natural History,—Memoirs, Vol. 2, Pt. 4, No. 6.

———. ———. Proceedings, Vol. XIX, Pts. 1 and 2.

Buenos Aires. Sociedad Científica Argentina,—Anales, Entrega I, Tome VI, Julio, 1878.

Calcutta. Agricultural and Horticultural Society of India,—Journal, Vol. V, Pt. 4.

———. Geological Survey of India,—Memoirs, Vol. XV, Pt. 1.

———. ———. Records,—Vol. XI, Pt. 3.

———. Ramayana,—Vol. VI, No. 7.

———. Mahábhārata,—Nos. 25, 26, 27.

Leipzig. Deutsche Morgenländische Gesellschaft,—Zeitschrift, Heft I. und II.

Heft II. *H. L. Fleischer*.—Zu Rückerts Grammatik, Poetik und Rhetorik der Perser. *A. Holtzmann*.—Indra nach den Vorstellungen des Mahábhārata.

*J. Goldzieher*.—Ueber Muhammedanische Polemik gegen Ahl al-Kitáb.

———. Kunde des Morgenlandes, herausgegeben von der Deutschen Morgenländischen Gesellschaft,—Abhandlungen, Band VI, No. 4.

Lisbon. Academia Real das Sciencias, classe de Sciencias Moraes, Politicas e Bellas-Lettras,—Historia e Memorias, Tomo IV, Parte 2.

———. ———. Classe de Sciencias Mathematicas, Physicas e Naturaes,—Memorias, Tomo V, Parte 1.

———. ———. Jornal, Tomo V, Dezembro, 1874-76.

———. Academia Real das Sciencias,—Sessão Publica, Dezembro, 1875, Maio, 1877.

London. The Athenæum,—Nos. 2646 to 2657, July to September, 1878.

———. The Geographical Magazine,—Vol. V, Nos. 6 to 9, June to September, 1878.

No. 6. *R. Michell*.—Russian Expedition to the Alai and Pamir. Topographical and Revenue Surveys of India, 1876-77. Retirement of Major-General Thuillier.

No. 7. *H. H. Howarth*.—The Country of the White Horde of Kipchak. Marine Surveys of India, 1876-77.

No. 8. Cyprus.—Sketches of Persia. Asiatic Turkey. Cartography.

No. 9. The Treaty of Berlin. Richthofen on Prejevalsky's Journey in Central Asia. *H. P. Malet*.—Indian Irrigation.

———. Statistical Society,—Journal, Vol. XLI, Part 2, June, 1878.

*W. Newmarch*.—On the Progress of the Foreign Trade of the United Kingdom since 1856, with Special reference to the effects produced upon it by the Protectionist Tariffs of other countries. *H. Clarke*.—On the Debts of Sovereign and Quasi-Sovereign States, owing by foreign countries.

———. Royal Astronomical Society,—Monthly Notices, Vol. XXXVIII, No. 8, June, 1878.

———. Institution of Civil Engineering,—Proceedings, Vols. LII, LIII, Pts. 2, 3.

———. Nature,—Vol. XVIII, Nos. 454 to 465, July to September, 1878.



London. Royal Geographical Society,—Proceedings, Vol. XXII, Nos. 1 to 6.

No. 3. *Bryce*.—On Armenia and Mount Ararat. *Evans*.—Lecture on the Magnetism of the Earth.

No. 4. *Gill*.—Travels in Western China and on the Eastern Borders of Tibet. *Trotter*.—On the Geographical Results of the Mission to Kashgar, under Sir T. Douglas Forsyth in 1873-74.

No. 6. *Stanley*.—Geographical Sketch of the Nile and Livingstone (Congo) Basins. *T. Dyer*.—Lecture on Plant-Distribution as a Field for Geographical Research.

———. The Royal Society,—Proceedings, Vol. XXVII, Nos. 187, 188.

No. 187. *Rev. S. Haughton*.—Notes on Physical Geology. *W. Marcet*.—Summary of an experimental enquiry into the Function of Respiration at various Altitudes.

No. 188. *Dr. E. L. Moss*.—Observations on Arctic Sea-Water and Ice.

———. Zoological Society,—Proceedings, Pt. 2, August, 1878.

*F. Nicholson*.—A List of the Birds collected by Mr. E. C. Buxton at Darra-Salam, on the Coast of Africa opposite Zanzibar. *A. Anderson*.—On a new species of Indian *Prenia*.

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———. Geological Society,—Quarterly Journal, Vol. XXXIV, Part 3, No. 135, August, 1878.

*J. G. H. Godfrey*.—On the Geology of Japan. *R. Daintree*.—On certain modes of occurrence of Gold in Australia.

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Lyon. Société d'Agriculture, Histoire Naturelle et Arts Utiles,—Annales, Tome IX, 1876.

———. Société de Géographie,—Bulletin, Nos. 10, 11, Mai et Juillet, 1878.

No. 10. *C. B.*—De la Colonisation Française en Nouvelle Calédonie.

No. 11. *R. P. Brucker*.—Les Colonies Hollandaises des Indes Orientales.

Moscow. Société Impériale des Naturalistes,—Bulletin, No. 4, 1877.

*H. Sandeberg*.—Esquisse préalable sur son voyage dans les régions de la mer glaciale.

Munich. Die K. B. Akademie der Wissenschaften, Mathematisch-Physikalische Classe,—Abhandlungen, Band XIII, Abtheilung 1.

———. ———. Sitzungsberichte,—Heft III, 1877.

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———. ———. Almanach, 1878.

Palermo. Società degli Spettroscopisti Italiani,—Memorie, Dispensa 6, 7, 8, 1878.

No. 7. *P. Tacchini*.—Osservazioni Spettroscopiche solari fatte a Palermo nel secondo trimestre del 1878.

- Paris. La Société de Géographie,—Bulletin, Avril, Mai, Juin, 1878.  
 Mai. *A. Raffray*.—Voyage à la côte nord de la Nouvelle-Guinée. *Dr. J. Montano*.—L'hygiène et les tropiques.  
 Juin. *C. de Ujfalvy*.—Voyage au Zuarafchâno, au Ferghanah et à Kouldja.  
 ——. La Société d'Anthropologie,—Bulletin, 4me Fasc., Juin à Décembre, 1877, et 1re Fasc., Janvier à Mars, 1878.  
 1re. Fasc. *Harmant*.—Population de l'Indo-Chine. *Bordier*.—Rapport sur Madagascar.  
 Pisa. Società Toscana di Scienze Naturali,—Atti, Vol. III, Fasc. 2.  
 Rome. R. Accademia dei Lincei,—Atti, Vol. II, 1878.  
 Roorkee. Professional Papers on Indian Engineering,—Vol. VII, No. 29, July, 1878.  
 Schaffhausen. La Société Entomologique Suisse,—Bulletin, Vol. V, Heft 6, 1878.  
 Stuttgart. Württembergische Naturwissenschaftliche Jahreshefte,—1874 to 1878.  
 Trieste. Società Adriatica di Scienze Naturali,—Bollettino, Vol. IV, No. 1, Aprile 1878.  
*Dr. C. Marchesetti*.—Di alcune piante usate medicalmente alle Indie Orientali.  
 Washington. The U. S. Geological and Geographical Survey of the Territories,—Report, 1877.  
 ——. ——. Bulletin, Vol. IV, No. 1.  
 ——. New Zealand Institute,—Transactions and Proceedings, Vol. X, 1877.  
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 ——. Die K. K. Central-Anstalt für Meteorologie und Erdmagnetismus,—Jahrbuch, Band 12, Jahrgang 1875.  
 ——. Die Anthropologische Gesellschaft,—Mittheilungen, Band 8, Nos. 1—4.  
 ——. Die K. K. Zoologisch-botanische Gesellschaft,—Verhandlungen, Band 27, 1877.

### BOOKS AND PAMPHLETS,

*presented by the Authors.*

- ADHARLAL SEN. Kusum Kanan, 2 Vols.  
 BLANFORD, W. T. Scientific results of the Second Yarkand Mission. *Reptilia and Amphibia, and Geology.*  
 CUST, R. A sketch of the Modern Languages of the East Indies.  
 HAYDEN, F. V. Report of the U. S. Geological Survey of the Territories, Vol. 7.  
 KAILAS CHANDRA SINHA. Raiamala, or the Annals and Chronicles of Tripura.  
 NESFIELD, J. C. Catalogue of Sanskrit MSS. existing in Oudh.

# MISCELLANEOUS PRESENTATIONS.

HAWKES, LIEUT. H. P. A brief Sketch of the Gold, Silver and Copper Coinage of Mysore.

E. LINDSTEDT.

JACKSON, W. H. Descriptive Catalogue of Photographs of North American Indians.

F. V. HAYDEN.

MILLER, J. Metaphysics, or the Science of Perfection.

A CITIZEN OF NEW YORK.

Selected Extracts from the Minutes of the Trustees, Indian Museum, from 1st April, 1874, to 31st March, 1877.

TRUSTEES OF THE INDIAN MUSEUM.

A Guide to the Exhibition rooms of the Departments of Natural History and Antiquities.

Catalogue of the *Chiroptera* in the Collection of the British Museum.

TRUSTEES OF THE BRITISH MUSEUM.

Low, C. R. History of the Indian Navy, in 2 Vols.

THE DEPT. OF REVENUE, AGRICULTURE AND COMMERCE.

NEIGHBOR, R. E., REV. A Vocabulary in English and Mikir, with sentences illustrating the use of words. (2 copies.)

HUNTER, W. W. A Statistical Account of Bengal, Vol. XX. Fisheries and Botany of Bengal.

Report of the Land Revenue Administration of the Lower Provinces for 1877-78.

Report of the Financial Results of the Excise Administration in the Lower Provinces for 1877-78.

Report of the Calcutta Court of Small Causes for 1877-78.

Annual Report on Inland Emigration for 1877-78.

Annual Report on Emigration from the Port of Calcutta to British and Foreign Colonies for 1877-78.

Report on the Calcutta Medical Institutions for 1877.

Annual Report on the Insane Asylums in Bengal for 1877.

Report on the Police of the Lower Provinces of the Bengal Presidency for 1877.

GOVERNMENT OF BENGAL.

Annual Medical Report of the Lying-in Hospital for 1877.

Annual Report of the Medical College, Session 1877-78.

Annual Report of the Lunatic Asylum for 1877-78.

MADRAS GOVERNMENT.

Report on the Epidemic of Cholera of 1875-76 in the Central Provinces. With Map.

Annual Report of the Sanitary Commissioner for 1877.

Report, with the Chief Commissioner's Review, on Forest Administration for 1877-78.

Report on the Nagpur School of Medicine for 1877-78.

Report on the Excise Revenue for 1877-78.

Report, with the Chief Commissioner's Review, on Education for 1877-78.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Historia dos Estabelecimentos Scientificos Litterarios e Artisticos de Portugal, 1874 to 1878.

J. S. RIBEIRO.

Ueber die lateinische Komödie.

A. SPENGLER.

*Aëtosaurus ferratus* Fr., die gepanzerte Vogel-Eidechse aus dem Stubensandstein bei Stuttgart.

DR. O. FRAAS.

AYTON, J. A. A Grammar of the Nepalese Language, 1820. (10 copies.)

BEDAUT, CAPT. T. H. G. The Persian and Urdu Letter-Writer, 1843.

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MULLAH HOOSSEIN. Ukhláqi Muhsunu Sheik Muslahuddun Gaudu Gera-zee—Dewani Sauda, Vols. I, II. Classic Selections.

NOUREDDEEN MOHAMMED ABDULLAH SHAIRAZY. Ulfaz Udwiye, or the Materia Medica in the Arabic, Persian and Hindi Languages, with an English Translation by Francis Gladwin, 1853.

A Comparative Vocabulary of the Barma, Maláya, and T'Hai Languages, 1810.

Ramajaya Tarkálankara,—Dáya Kaumudi, Dattaka Kaumudi and Vyavastha Sangraha, 1827.

Lakshminarayana Sarma,—Dattaka-Kaumudi.

Lakshminarayana Sarma,—Dayadhikara Krama Datta Kaumudi.

Lakshminarayana Nyayalankara,—Mitakshara Darpana, 1824.

Raghiyi Bhonsla ka Vansavali Kumra,—Dattaka Chandrika, 1817.

Taranatha Tarka Vachaspati,—Salidarth Ratna, 1908.

SECRETARY TO BOARD OF EXAMINERS, FORT WILLIAM.

PERIODICALS PURCHASED.

Benares. A New Hindustani-English Dictionary,—Parts 16 and 17, August and September 1878.

Berlin. Journal für reine und angewandte Mathematik,—Juli und August 1878.

Bombay. The Vedáarthayatna, or an attempt to interpret the Vedas,—Book 2nd, Nos. 11 and 12.

- Bordeaux. Société de Géographie Commerciale,—Bulletin, Nos. 14 to 18.  
 No. 17. *H. Feuilleret*.—Géographie commerciale de la Russie.
- Calcutta. The Calcutta Review,—No. CXXXIV, October 1878.  
*J. W. Furrell*.—Cyprus, before the time of Amasis. *Rev. A. F. R. Hoernle*.—  
 The Local Distribution and Mutual Affinities of the Gaudian Languages, with  
 a Map.
- . The Indian Medical Gazette,—Vol. XIII, Nos. 8, 9, 10,  
 ———. Stray Feathers,—Journal, Vol. VI, Nos. 1 to 6.
- Edinburgh. The Edinburgh Review,—No. 303, July 1878.
- Giessen. Jahresbericht über die Fortschritte der Chemie,—Erstes Heft,  
 1877.
- Göttingen. Göttingische Gelehrte Anzeigen,—Stücken 26—37.  
 ———. ———. Nachrichten,—Nos. 12, 13, 14.  
 No. 12. *Benfey*.—Der Bindevocal E im Sanskrit.
- Leipzig. Annalen der Physik und Chemie,—Band 4, Hefte 3, 4; Band 5,  
 Heft 1.  
 ———. ———. ———. Beiblätter,—Band 2, Stück 7, 8.
- London. The Academy,—Nos. 323 to 334, 1878.  
 ———. The Annals and Magazine of Natural History,—Vol II, Nos. 7,  
 8, 9, 1878.  
 No. 7. *Dr. A. Günther*.—Preliminary Notices of Deep-Sea Fishes collected  
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- . The Chemical News,—Vol. XXXVIII, Nos. 972 to 983, 1878.  
 No. 38. *H. Wilde*.—On the origin of Elementary Substances, and on some  
 new relations of the Atomic Weights. *C. M. Tidy*.—Composition and quali-  
 ty of the Metropolitan Water.
- . The Entomologist,—Vol. IX, Nos. 182, 183, 184, July, August,  
 September, 1878.
- . The Entomologist's Monthly Magazine,—Vol. XV, Nos. 170,  
 171, 172.
- . The Ibis,—4 Series, Vol. II, No. 7, July 1878.  
*T. Blakston and H. Pryer*.—A Catalogue of the Birds of Japan. *H. Seebohm*.—  
 Contributions to Ornithology.
- . The Journal of Botany,—Vol. VII, Nos. 187—189.  
 No. 187. *H. F. Hance*.—On some New Malayan *Corylaceæ*.
- . Society of Arts,—Journal, Vol. XXIV, Nos. 1338 to 1349, 1878.  
 Nos. 1339 to 1343. *T. Bolas*.—Application of Photography to the Production  
 of Printing Surfaces.  
 No. 1343. Indian Trade Routes.  
 No. 1344. Adult instruction through Public Museums.  
 No. 1345. Recent Obstructions in Telegraphy.  
 No. 1346. Congress of Hygiene at Paris. The Post Office and recent advan-  
 ces in Telegraphy.  
 No. 1348. The Caravan Routes.  
 No. 1349. The Opium Trade in China.

London. The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science,—Vol. VI, Nos. 34, 35, 36.

No. 34. *J. Croll*.—On the origin of Nebulæ. *Prof. Hughes*.—On the Physical Action of the Microphone.

No. 35. *Col. A. R. Clarke*.—On the Figure of the Earth. *W. Siemens*.—On Telephony. *W. J. Millar*.—On the Transmission of Vocal and other Sounds by Wires.

———. The Messenger of Mathematics,—Nos. 87, 88, 89.

———. The Nineteenth Century,—July, August, September 1878.

July. *Rev. T. W. Fowle*.—The place of Conscience in Evolution. *Col. C. Brackenbury*.—Ironclad Field Artillery. *N. Lockyer*.—What the Sun is made of. *Rev. R. W. Dale*.—Impressions of America. *Sir D. Wedderburn*.—Protected Princes in India.

August. *Miss F. Nightingale*.—The People of India. *F. W. Rowsell*.—Malta.

September. *W. R. Creg*.—Foreign Policy of Great Britain. *W. R. S. Ralston*.—Henri Gréville's Sketches of Russian Life. *E. Dickey*.—Nubar Pasha and our Asian Protectorate. *Sir W. Medhurst*.—The Chinese as Colonists.

———. Mind,—Nos. 6, 7, and 11, 1878.

No. 7. *A. Bain*.—Education as a Science. *The Editor*.—English thought in the 18th Century.

No. 11. *G. J. Romanes*.—Consciousness of Time. *A. Bain*.—Education as a Science. *A. Sedgwick*.—The Negative Character of Logic. *Rev. W. Cunningham*.—Political Economy as a Moral Science.

———. The Numismatic Chronicle and Journal of the Numismatic Society,—Part 2, No. 70, 1878.

*P. Gardner*.—Macedonian and Greek Coins of the *Seleucidæ*.

———. Quarterly Journal of Pure and Applied Mathematics,—No. 6, June 1878.

———. The Quarterly Journal of Science,—No. 58, July 1878.

The Senses of the Lower Animals.—On the Possibility of Explaining Past changes in the Universe by Causes at present in operation.

———. The Quarterly Journal of Microscopical Science,—No. 71, July 1878.

———. The Quarterly Review,—No. 291, July, 1878.

———. The Westminster Review,—No. 107, July 1878.

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No. 91. *H. Goldmark*.—Effect of Temperature upon Atmospheric Electricity. *E. W. Blake, Jr.*.—A Method of recording Articulate Vibrations by means of Photography.

No. 92. *A. Gray*.—Forest Geography and Archæology. *J. LeConte*.—Structure and origin of Mountains.

Paris. Revue et Magasin de Zoologie,—3 Série, T. 5, Nos. 6—12, 1877.

———. Annales de Chimie et de Physique,—Mai—Aout 1878.

Juin. *M. A. Lamy*.—Sur la solubilité de la chaux dans l'eau.

Juillet. *J. M. Crafts*.—Sur une nouvelle forme de thermomètre à air. *M. Dumas*.—Sur la présence de l'oxygène dans l'argent métallique.

Paris. Comptes Rendus,—Tome 87, Nos. 1—12, 1878.

No. 3. *M. Berthelot*.—Remarques concernant l'influence de l'électricité atmosphérique à faible tension sur la végétation.

———. Journal des Savants,—Juin—Aout, 1873.

Juin. *B. Saint-Hilaire*.—La Religion de Zoroastre.

Aout. *M. M. de Quatrefages*.—Histoire des Tasmaniens.

———. Revue des Deux Mondes,—Juillet—Septembre, 1878.

Juillet. *A. Leroy-Beaulieu*.—L'Empire des Tsars et les Russes. *A. Houssaye*.—Voyage autour du monde à l'Exposition Universelle.

Aout. *J. de la Garière*.—La marine de l'avenir et la marine des anciens.

*M. G. Bousquet*.—La Chine et la Japon à l'Exposition Universelle. *A. Breguet*.—La Transmission de la Parole. Le Phonographe, le Microphone, l'Aérophone.

*A. Leroy-Beaulieu*.—L'empire des Tsars et les Russes.

Septembre. *L. Carrau*.—L'expression des émotions et l'origine du Langage d'après de récentes publications.

———. Revue Critique,—Nos. 27, 28. Juillet, Septembre, 1878.

No. 27. *G. Schlumberger*.—Numismatique de l'Orient latin.

No. 28. *F. Kielhorn*.—Kâtyâyana et Patanjali.

No. 31. *Arnold*.—L'Islam selon l'histoire, son caractère et ses rapports avec le Christianisme.

No. 33. *C. Hippeau*.—L'instruction publique en Russie. Catalogue de l'exposition du Ministère de l'instruction publique de Russie.

No. 34. *Col. G. B. Mainwaring*.—Grammaire de la langue Rong.

No. 35. *A. C. Burnell*.—Le Samhitopanishad brahmana du Sama Veda, texte Sanscrit avec commentaire, et le texte Jaiminiya de l'Arsheyabrahmana du Sama Veda. *A. Weber*.—Pancadandachattraprabandha.

No. 36. *D. Hoffmann*.—Essais sur les lois du Pentateuque.

No. 37. *R. Meyer*.—Le Rigvidhâna.

———. Revue Scientifique,—Juillet—Septembre, 1878.

Juillet. *Général Brialmont*.—Rôle de la fortification improvisée dans la guerre d'Orient de 1877. Les machines à vapeur. *M. Naville*.—La question du sommeil. La Météorologie. *M. G. de Rialle*.—Le Culte Fétichique—les Manes, les Ancêtres et les Esprits.

Août. *M. Maëda*.—La Société Japonaise.

Septembre. Les Russes dans l'Asie Centrale.

### BOOKS PURCHASED.

The Native Chiefs and their States. 8vo., Bombay, 1877.

The International Numismata-Orientalia. Vol. I, London, 1878.

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KIELHORN, F. The Vyâkarana-Mahâbhâshya of Patanjali. Vol. I, Parts 1 and 2. Pamphlet, Bombay, 1877.

WILSON, J. Indian Caste. 2 Vols. 1877. 8vo. Bombay, 1877.

SCHÆBEL, C. E'tude sur le rituel du respect social dans l'état Brahmanique. 8vo., Paris, 1870.

———. Recherches sur la religion première de la race Indo-Iranienne. 8vo., Paris, 1872.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR DECEMBER, 1878.

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The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th instant, at 9 o'clock P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last meeting were read and confirmed.

The following presentations were announced :—

From R. Gordon, Esq., *La Terre, description des phénomènes de la vie du globe*, par E. Reclus. 2 Vols.

From R. S. Brough, Esq., *Instructions for testing Line Batteries &c., and Guide to the technical Arrangement of Telegraph Offices in India*. By L. Schwendler, Vol. I, 2nd Edition, and Table of Correction Coefficients for facilitating the computation of the results of Line Tests.

The following gentlemen, duly proposed and seconded at the last Meeting, were balloted for and elected Ordinary Members—

Rajah Luchmun Sing, Deputy Collector, Bullundshahar.

Babu Krishna Ghopal Bakhta.

The following are candidates for ballot at the next Meeting—

R. Sewell, Esq., M. C. S., proposed by Capt. Waterhouse, seconded by C. H. Tawney, Esq.

J. F. Browne, Esq., C. S., M. R. A. S., proposed by H. Rivett-Carnac, Esq., C. S., C. I. E., F. S. A., M. R. A. S., seconded by Captain J. Waterhouse.

Capt. W. E. Gowan, Offg. Garrison Quarter-Master, Fort William, proposed by Capt. J. Waterhouse, seconded by J. Crawford, Esq., C. S.

The SECRETARY announced that Mr. J. Behrendt had intimated his desire to withdraw from the Society.

The SECRETARY reported that up to date, Rs. 1,086 had been subscribed toward the Blochmann Memorial Fund.



The PRESIDENT called attention to the fact that an additional sum of Rs. 400 to Rs. 500 was required in order to procure a bust of the Society's late Philological Secretary.

The PRESIDENT announced that, in accordance with Rules 37 and 38, of the Society's Bye-Laws, the names of the undermentioned gentlemen had been posted up, as Defaulting Members, since the last Monthly General Meeting, and would now be removed from the List of Members, and published in the Proceedings.

|                          |                          |
|--------------------------|--------------------------|
| R. F. Chisholm, Esq.     | R. D. Stewart, Esq.      |
| J. E. Cooke, Esq.        | N. A. Belletty, Esq.     |
| F. W. A. De Fabeck, Esq. | W. G. Bligh, Esq.        |
| R. Forrest, Esq.         | Bábu Gurucharana Dáss.   |
| R. T. Hobart, Esq.       | „ Chandramohana Gosvámí. |
| J. C. Leupolt, Esq.      | „ Niranjan Mukerji.      |
| J. Pickford, Esq.        | „ Yogendranáth Mallika.  |
| G. Shelverton, Esq.      | Maulvi Habiburrahman.    |
| Capt. H. B. Spearman.    | Shashagiri M. Sástri.    |

The SECRETARY reported that duplicate copies of Beal's ' Dharmapada,' Cust's ' Modern languages of the East Indies' and Haug's ' Essays on the Parsis' were available for sale.

Mr. F. R. MALLETT communicated the following correction, received from Mr. Hugh Fraser, regarding the particulars already reported of the fall of the Dandapur meteorite (see ' Proceedings' for November).

" A few days ago I made enquiries on the spot regarding the third fragment of meteorite, said to have fallen at the same time as the two fragments I sent in September. I find that no other fragment fell, and the police in their report evidently mixed up two stories about one fragment which fell on the border of a tank or *jhíl*. I can also find no one who says he saw anything like a cloud or smoke, as was reported. The story they told me was that about 5 in the afternoon a loud noise, like "sun sun sun" was heard. Some say it seemed to approach from the north-east; but others say it seemed merely to be straight above. Then there was a loud report like a single clap of thunder, but nothing was visible, and they thought it was some god passing, or a fire-work like a bomb. One fragment fell in a *darzi's* house-yard. The earth was hard there, so it did not make a hole. No one was present at the moment, but when they came up, a *ghari* afterwards, the stone was not hot, and had a whitish flush over it (as far as I can make out) like charcoal when it cools. The other fragment fell in some marshy land, distant 700 paces, as far as I could measure

(there were sugar-cane fields and a tank partly in the way), from the *darzi's* house. Some people who were in their fields not far off searched for it, and found it buried about a cubit deep in the mud. It was not hot when they found it.

The general account is that the day was still. There was a break in the rains at the time, and except for a few not heavy clouds to the south and west, the sky was bright and clear. It was useless attempting to get any estimate of the duration of time during which the whizzing sound was heard. The crack is said to have been heard for 4 *kos* (about 8 miles) all round. I was afraid this account is somewhat vague and useless, but it is the best that can be got from the natives who were on the spot."

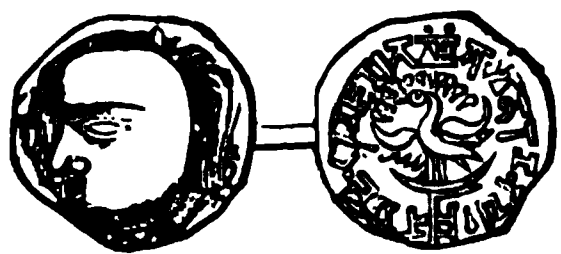
Mr. LYDEKKER exhibited the palate of a large anthropoid ape which had lately been discovered by Mr. Theobald in the Siwálíks of the Punjab; and made the following remarks:

The jaw was that of a female animal, as indicated by the small size of the canine, and indicated an animal intermediate in size between the Orang and the Gorilla. The molar teeth are of the form which is common to man and the living anthropoid apes; the false molars are, however, much narrower than in any of the latter, and are indeed relatively narrower than in man; the small size of the last molar and of the incisor are also characters in which the jaw has a human character. Of the living apes the Chimpanzee makes the nearest approach to the fossil, though the premolars are much wider in that species. The straight line of the molars, the relatively larger canine, and the diastema are quadrumanous characters.

The specimen is of great interest as it is the first of the large anthropoid apes discovered in India; it seems to afford evidence of a connection of Western Africa, the land of the Gorilla and Chimpanzee, on the one hand, and of Sumatra and Borneo the home of the Orang, on the other, with Northern India. The specimen will shortly be described and figured in the "Records" of the Geological Survey.

Dr. RA'JENDRALA'LA MITRA exhibited a new silver coin which he had received for identification from Mr. H. Rivett-Carnac. The coin was in a fair state of preservation, and weighed 34 grains, or a little over half an obolus. Its periphery was irregular, but the inscription on the exergue of

the reverse, was complete. The obverse of the coin bore a head of the Sháh type in profile, facing the left; and the reverse, a peacock with out-stretched wings and expanded tail, as common in the peacock coins of Kumára Gupta. The peacock, according



to the Purāṇas, is the vehicle of Kumāra *alias* Kārtika, the god of war ; and the Gupta prince, having the same name, adopted the vehicle of his name-sake for his symbol. No attempt, however, was made to change the character of the head so as to make it in any way accord with the likeness of the person on whose coin it was struck. The likeness is the same on the coins of nineteen different kings of the Shāh dynasty of Guzerat, as also on the mintage of Kumāra Gupta, and on the specimen under notice. Even the horned helmet, first borrowed from the Indo-Bactrians, remains unchanged, though it is not at all likely that Kumāra Gupta ever bore such a head-dress. In so far the type remains the same for, as far as we are at present informed, 22 or 23 reigns ; but the artistic excellence of the design deteriorated markedly in course of time. The earliest Shāh coins are remarkable for the high relief of the head ; the eye so formed as to show the swelling of the eye-ball ; the lips pouting ; and the locks of hair behind the head shown in profusion. In the specimen under notice, the relief is low ; the eye, a full one, formed of two curving lines on a profile face, as was usually the case in Egyptian sculpture ; the lips indicated by two dots ; and the locks attenuated to two or three wavy lines. In front of the head there is a monogram, but it is partially obliterated, and its character cannot be fully made out. In the Shāh coins the monogram contains the date. In the earlier Shāh coins a Greek inscription is also met with, but it does not occur in the specimen under notice.

On the reverse the change is complete ; the whole of the Shāh symbols being replaced by the peacock. The inscription round the peacock is in the Gupta character, and, on the whole, clear and well preserved. Owing, however, to the habit of the Gupta artists sadly neglecting the vowel-marks and the rules of grammar, it is difficult to determine with precision the meaning of the record. The letters as read by Dr. Mitra are :—

श्रीनयसेन दे(?)रजपतरंजं तरमनरक्षमय

The first compound letter is unmistakeable ; it is the well known *S'ri*, the auspicious symbol invariably used before proper names in Indian writings. As far as reading is concerned the next four are clear enough ; the Dr. reads them *Nayasena* or “ he who has justice for his army ;” but he could not positively assert whether they are the components of a proper name, or those of an epithet. Coming after *S'ri* they seem to indicate a proper name, while their meaning suggests the idea of an epithet. The key to the solution of the question lies in the next letter ; but it is extremely doubtful. Its counterpart has been met with in some Indo-Sassanian coins, (Thomas' ‘ Prinsep,’ plate XLI), and there it is equivalent to दे (*de*) ; but by reading it दे here no meaning can be extracted from it. The mark for e is a spur on top, as seen very indistinctly on the letter s in Sena ; but

here it is indicated by a hook hanging behind. This hook has been repeatedly found to stand for i, and it gradually lengthened till it became the modern ikára in Nágari writing. Dr. Mitra was disposed therefore to take it for an i, making the syllable *di*. Assuming then, the inherent vowel of the preceding ऋ to be a long one, he got *ádi* “first,” and, linking it with the next two letters, the result is *ádirája* or “the first king”, the founder of the family. The next two letters प and ण should in that case be taken for *putra* “son”—“the son of the auspicious first king Nayasena.” The omission of the u under p is not material, but the spur for r under the t is not common (under the first word *S’rí* it is distinctly shown,) but without assuming the omission no sense can be extracted from *pata*. The letters र and ण with dots over them may safely be taken for *rájña*, the genitive singular of *rájan* ‘a king.’ The name of the son is *Taramana*, which, there is no reason to doubt, is the same with *Toramána*, the sovereign whose name occurs in the History of Káshmir and in the Iran boar and the Gwalior inscriptions. The letter r of the name is very faint and indistinct. The last four letters call for no remark. The first three, र ण and ण, are unmistakable, and the last, (य) though somewhat smudgy, is suggested by the context. The result is *raṇanátha*, “the lord of war.” The restored version according to this reading would be:—

*S’rí Nayasenádirája-putra-rájña Toramána raṇanátha.*

And in English “(The coin) of the king Toramána, the lord of battle, son of the auspicious first king Nayasena.”

This interpretation, however, is open to a serious objection. In the History of Káshmir, Toramána is described to be the son of one Sreshṭhasena and not Nayasena, and, unless the latter be accepted as an *alias* of the former, the interpretation must be wrong. Dr. Mitra was disposed to believe that the two names belonged to the same person; but if this be inadmissible, it would be necessary to take the letter ञ to be a remnant of Deva, and *pata* to be the remnant of *pati* a ‘lord,’ the meaning of the whole being thus rendered—

“(The coin) of the auspicious (*S’rí*) king Toramána, the divine (*deva*), the master of kings (*rájapati*), the lord of battle (*raṇanátha*), who had justice for his army (*nayasena*).” As the word Toramána cannot be converted into an epithet, the words Nayasena Deva cannot be taken to be the name of the king. Thus whatever interpretation is accepted the coin must be attributed to Toramána, and a strong proof of this is afforded by the coin described by Mr. Thomas in his edition of Prinsep’s Essays (II, p. 339) as an “unpublished and unique” specimen, which, in weight, character and devices, closely corresponds with the specimen now under notice. The only difference between the two lies in the inscription; but as Mr. Thomas’ specimen was very imperfect, and nothing beyond the name could be satisfac-

torily read on it, it is of no importance ; not to advert to the fact of it having been formerly a common practice with kings to change the legends and inscriptions of their coins.

Dr. RÁJENDRALÁLA MITRA next exhibited some Hindi MSS. which he has lately obtained from Bábu Brajanáth Bandyopádhyáya of Jaypur.

The first work he noticed was named *Sarfaráj-chandriká*. It is a *puthi* of 92 folia, each 8 × 5 inches. It opens with a brief notice of Sarfaráj, the hero, who is said to have been the 10th in descent from Śaṅkara Āchārya, the great Vedantist. It is stated that Śaṅkara had four sons : 1st, Toṭaka Āchārya, 2nd, Padma Āchārya, 3rd, Udyama Āchārya, 4th, Bālagovinda ; and the sons of these formed the ten founders of the Daśanāmi sect. One of them was, (3) Omkāra, and his descendants were successively, (4) Purushottama, (5) Chandaka Giri, (6) Nārāyaṇa Giri, (7) Dhyāna Giri, (8) Rajendra Giri, (9) Umrao Giri, (10) Sarfaráj. It was for the instruction of the last that the work was composed by Devakinandana Kavi, son of one Bhavasāgara, a Kanauji Brāhman. Judging from its style the work cannot be older than the 14th century. Its subject is mystic poetry, describing the amours of Krishna and Rādhā. The codex is dated Samvat 1843, and is 90 years old.

The second work shown was a genealogical table of the Rájās of Jaypur. Its first folium was wanting, and therefore it was not possible to ascertain the name of the founder ; but there were altogether 238 names, and, if the list be reliable, the founder must have lived in a remote period of antiquity. The later names have dates attached to them, and a short chronicle of the later kings is appended. The last folium is wanting, and nothing can be said of the authenticity of the work.

The third work has three names. On its cover it is called *Kewat Rásá* ; in the introduction, *Anantarāya Sākhláki Váratá*, and in the colophon, *Anantarāya Sākhláki vát*. The word *rásá* appears to be a generic term for biography. It is used both for poetical and prose compositions, and occurs under different forms. In the oldest MS. of Chand the form most common is *Ráyasá*, but in some later MSS. of that work *Rásá* is sometimes met with. The better order of people at Benáres invariably use the former ; but in the Marhaṭṭá country the latter is preferred, the common term there for this class of composition being *Bákhars*. *Rásá* also prevails in Rájputáná, where its synonyms are *Vilása*, *Charitra*, and *Prakása*. The work under notice was originally written in the ballad style by a family bard, or Bhaṭṭa, of the hero, in Samvat 1347, but it was recast and a great deal of prose introduced into the text in the Samvat year 1854 by a scribe. The hero is Anantarāya, a petty prince of Kolápur Páṭan. He lived in the second half of the 14th century, and his struggles against Muhammadan ascendancy form the subject of the work.

The fourth was entitled *Hamír Rásá*. It is a small work of 54 folia 4to, written in the ballad style of Chand's *Prithviráj Ráyásá*, the language being old Hindi, but not quite so archaic as that of Chand's. The hero of the ballad is Hamír, the renowned sovereign of Ranthambor, whose name has served as a title of honor to many an Indian chief since his time. He lived in the time of 'Aláuddín, against whom he waged a devastating war for many years. The author of the work is Maheśa who was the family bard or Bhaṭṭa of the hero. The MS. is dated Samvat 1861, and is seventy-four years old. Dr. Mitra also submitted an English translation of the work by Bábu Brajanáth Bandyopádhyáya, and suggested that, after revision, it be printed in the Journal.

The following papers were read—

1. *A peculiarity of the River Names in Assam and some of the adjoining countries.*—By S. E. PEAL, Esq.

This paper will be published in the Journal, Part I.

2. *Physiographical Notes on Tanjore.*—By LIEUT.-COL. B. R. BRANFILL, Deputy Superintendent, Survey of India. Communicated by COL. J. T. WALKER, C. B., R. E., Surveyor General of India.

This paper will be published in the Journal, Part II.

3. *On the proper relation of the Sectional Areas for Copper and Iron Lightning Rods.*—By R. S. BROUGH, Esq.

(Abstract.)

In this paper the author shows that the usually accepted statement that an iron lightning rod should have 4 times the sectional area of a copper rod is erroneous and that the proper proportion is 8 to 3.

The paper will be published in the Journal, Part II.

4. *On Arvicola Indica, Gray, and its relations to the sub-genus, Nesokia, Gray.*—By DR. J. ANDERSON.

This paper will be published in the Journal, Part II.

Mr. W. T. BLANFORD said that he had a few years ago, paid some attention to the genus *Nesokia*, but at that time he had not sufficient materials for a complete understanding of the species. Indian Zoologists were indebted to Dr. Anderson for working out a very difficult subject.

Although Mr. Blanford was not quite convinced of the identity of *Arvicola indica* with *Nesokia hardwickei*, he quite agreed with Dr. Anderson that the specific name *indica* should be abandoned. The original figure of *Arvicola indica* in the "Illustrations of Indian Zoology" was probably taken from a bad native drawing of an ill-stuffed specimen. The name



*N. indica* had been for so long generally applied to the other common Indian species that to transfer the specific term would cause great confusion, and should be avoided if possible. It must be understood, however, that if it be once conceded that the plate in Gray and Hardwicke's 'Illustrations' was undoubtedly intended to represent *N. hardwickei*, there was no choice in the matter, the rules of nomenclature must be followed and the species must stand henceforth as *N. indica*. It was no more practicable to substitute the later name *N. hardwickei*, than to apply the still more recent term of *Spalacomys indicus*. He considered that in the absence of any type, there was a sufficient uncertainty as to what rat was represented by *Arvicola indica* to justify the disuse of the specific name.

The speaker added that he had dug up some of the burrows of *Nesokia hardwickei* and traced them over a large space of ground. One especially in Sind he had traced for between 40 and 50 yards and finally captured the inmates, an adult male and female, and two fully grown but younger animals, also a pair. The burrow was sometimes close to the surface, but in places as much as two feet beneath the ground, and contained a chamber lined with fragments of grass, but no store of grain.

5. *On the Indian Species of the genus Erinaceus.*—By DR. J. ANDERSON.

This paper will be published in the Journal, Part II.

6. *Description of a supposed New Hedgehog from Muscat in Arabia.*—By W. T. BLANFORD, F. R. S., &c.

(Abstract.)

Amongst a collection of small mammals, birds and reptiles sent to the writer by Col. Miles, the Political Agent at Muscat, were two specimens, one preserved in spirit, the other a dried skin, of an apparently undescribed *Erinaceus*, somewhat intermediate in characters between the Indian *E. collaris* and the Persian and Baluchistan *E. macracanthus* and *E. megalotis*, being larger than the former and having longer spines, whilst it is inferior in both respects to the two latter. The following is a brief description—

ERINACEUS NIGER, *sp. nov.*

Black above; the spines from an inch to an inch and a quarter long on the hinder part of the back, black at the points for half an inch, then surrounded by a narrow white ring, then dusky to near the base. All the lower parts blackish brown. Ears long, rounded at the end, thinly clad outside and near the margin inside with short whitish hairs. Head sooty black with a few grey hairs intermixed. Feet of moderate size, each with five claws, the inner claw on each hind foot much smaller than the others. Length of a female specimen in spirit (and doubtless somewhat contracted)

from nose to anus 5·5, of tail 0·9, of ear from orifice 1·6, breadth of ear 0·9, length of palma 0·9, of planta 1·25 inches. The skull is 1·9 inches long and 0·98 broad across the zygomatic arches.

This paper will be published in the Journal, Part II.

7. *Description of a New Homopterous Insect, belonging to the genus Cosmoscarta.*—By W. L. DISTANT. Communicated by J. WOOD-MASON.  
(Abstract.)

The insect described and named *Cosmoscarta masoni* was found at Taoo, in Tenasserim by Mr. Limborg.

The paper will be published in the Journal, Part II.

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LIBRARY.

The following additions have been made to the Library since the Meeting held in November last.

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*presented by the respective Societies or Editors.*

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# I N D E X

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[APPENDIX.]

ABSTRACT STATEMENT  
OF  
RECEIPTS AND DISBURSEMENTS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR  
THE YEAR 1877.

# STATEMENT, *Abstract of the Cash Account*

| RECEIPTS.                                               |     |       |        | 1877.  | 1876.         |
|---------------------------------------------------------|-----|-------|--------|--------|---------------|
| BALANCE OF 1876.                                        |     |       |        |        |               |
| In the Bank of Bengal, viz.                             |     |       |        |        |               |
| Account of Stoliczka Memorial Fund, ..                  | Rs. | 334   | 10     | 5      |               |
| Account of Dr. Oldham Memorial Fund, ..                 |     | 130   | 8      | 0      |               |
| Account of Piddington Pension Fund, ..                  |     | 70    | 11     | 2      |               |
| Account of Asiatic Society of Bengal, ..                |     | 3,213 | 13     | 2      |               |
|                                                         |     | <hr/> |        |        |               |
|                                                         |     |       | 3,749  | 10     | 9             |
| Cash in hand, ..                                        |     |       | 218    | 6      | 3             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 3,968  | 1      | 0             |
|                                                         |     |       |        |        | 4,018 11 7    |
| ADMISSION FEES.                                         |     |       |        |        |               |
| Received from Members, ..                               |     |       | 880    | 0      | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 880    | 0      | 0             |
|                                                         |     |       |        |        | 800 0 0       |
| SUBSCRIPTIONS.                                          |     |       |        |        |               |
| Received from Members, ..                               |     |       | 7,200  | 2      | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 7,200  | 2      | 0             |
|                                                         |     |       |        |        | 9,009 1 9     |
| COMMUTED SUBSCRIPTIONS.                                 |     |       |        |        |               |
| Received from Members, ..                               |     |       | 770    | 0      | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 770    | 0      | 0             |
| PUBLICATIONS.                                           |     |       |        |        |               |
| Sale proceeds of Journal and Proceedings, ..            |     |       | 832    | 7      | 0             |
| Subscription to ditto, ..                               |     |       | 776    | 11     | 0             |
| Refund of Postage Stamps, ..                            |     |       | 24     | 3      | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 1,633  | 5      | 0             |
|                                                         |     |       |        |        | 1,535 8 0     |
| LIBRARY.                                                |     |       |        |        |               |
| Sale proceeds of Books, ..                              |     |       | 222    | 8      | 0             |
| Refund of Postage Stamps, ..                            |     |       | 4      | 13     | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 227    | 5      | 0             |
|                                                         |     |       |        |        | 312 9 6       |
| FINES AND COMMISSIONS.                                  |     |       |        |        |               |
| Fines, &c., ..                                          |     |       | 40     | 13     | 0             |
| Commission on purchase of Stamps, ..                    |     |       | 6      | 10     | 9             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 47     | 7      | 9             |
|                                                         |     |       |        |        | 45 7 3        |
| CONTINGENT CHARGES.                                     |     |       |        |        |               |
| Sale proceeds of waste papers, ..                       |     |       | 6      | 8      | 0             |
| Ditto ditto of old Zinc Sheeting, ..                    |     |       | 15     | 0      | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 21     | 8      | 0             |
|                                                         |     |       |        |        | 15 1 0        |
| VESTED FUND.                                            |     |       |        |        |               |
| Sale proceeds of 5½ per cent. Government Securities, .. |     |       | 17,000 | 0      | 0             |
| Interest on ditto ditto, ..                             |     |       | 265    | 0      | 11            |
| Premium on ditto ditto, ..                              |     |       | 236    | 0      | 0             |
|                                                         |     |       | <hr/>  |        |               |
|                                                         |     |       | 17,501 | 0      | 11            |
|                                                         |     |       |        |        | 1,63,675 14 8 |
| Carried over, Rs.                                       |     |       |        | 32,248 | 13 8          |
|                                                         |     |       |        |        | 1,79,412 5 9  |



## No. 1.

*of the Asiatic Society for 1877.*

## DISBURSEMENTS.

| PUBLICATIONS.                                                                                                 |            | 1877.      | 1876.      |
|---------------------------------------------------------------------------------------------------------------|------------|------------|------------|
| Paid Freight for sending Journal and Proceedings to England, ..                                               | 156 15 0   |            |            |
| Ditto Lithographing and Engraving charges, &c., ..                                                            | 1,316 14 6 |            |            |
| Ditto Printing charges, ..                                                                                    | 5,521 15 7 |            |            |
| Ditto Commission on Collecting Bills, ..                                                                      | 1 14 6     |            |            |
| Ditto Purchase of Postage Stamps, ..                                                                          | 284 15 6   |            |            |
| Ditto Packing charges, ..                                                                                     | 28 5 0     |            |            |
| Ditto Paper for Plates, ..                                                                                    | 103 13 3   |            |            |
| Ditto overland carriage on parcels of Lithographed Plates, from England, ..                                   | 41 4 0     |            |            |
| Ditto J. Smidt, Esq. for drawing, printing and colouring 750 copies of plate ( <i>Garrulax Michales</i> ), .. | 158 0 9    |            |            |
| Ditto Petty charges, ..                                                                                       | 9 6 6      |            |            |
| Ditto A. Grote, Esq., in advance for publication charges of Mr. Moore's papers on Lepidoptera, £50, ..        | 571 6 10   |            |            |
|                                                                                                               |            | 8,194 15 5 | 8,893 14 6 |

## LIBRARY.

|                                                           |           |            |            |
|-----------------------------------------------------------|-----------|------------|------------|
| Paid Commission on collecting Bills, ..                   | 0 4 6     |            |            |
| Ditto Landing charges, ..                                 | 26 1 3    |            |            |
| Ditto Book Binding charges, ..                            | 476 1 0   |            |            |
| Ditto Salary of Punkah Bearer, ..                         | 38 5 6    |            |            |
| Ditto Subscription to the Calcutta Review, ..             | 16 0 0    |            |            |
| Ditto ditto to the Medical Gazette, ..                    | 15 0 0    |            |            |
| Ditto ditto to Stray Feathers, ..                         | 11 0 0    |            |            |
| Ditto ditto to Vedarthyatna, ..                           | 12 12 0   |            |            |
| Ditto purchase of Books through Messrs. Trübner & Co., .. | 1,352 8 1 |            |            |
| Ditto ditto through Messrs. Friedlander, ..               | 557 14 1  |            |            |
| Ditto ditto through Bernard Quaritch, ..                  | 182 4 10  |            |            |
| Ditto ditto through Lt.-Col. H. H. Godwin-Austen, ..      | 187 5 0   |            |            |
| Ditto ditto through Ernest Leroux, ..                     | 44 13 6   |            |            |
| Ditto ditto in Calcutta, ..                               | 296 9 6   |            |            |
| Ditto Salary for Cataloguing Library Books, ..            | 352 4 0   |            |            |
| Ditto ditto for Persian Library Books, ..                 | 352 7 3   |            |            |
| Ditto ditto for Mr. Hodgson's Nepalese Sans. MSS., ..     | 230 7 9   |            |            |
| Ditto ditto for numbering Library Books, ..               | 21 4 0    |            |            |
| Ditto for Kheroah cloth for Sans. MSS., ..                | 70 6 0    |            |            |
| Ditto Tape for ditto, ..                                  | 5 0 0     |            |            |
| Ditto Paste-board for Sans. MSS., ..                      | 83 8 9    |            |            |
| Ditto Insufficient and Bearing Postage, ..                | 9 13 6    |            |            |
| Ditto Petty charges, ..                                   | 29 14 3   |            |            |
|                                                           |           | 4,372 0 9  | 3,161 7 7  |
| Carried over, Rs.                                         |           | 12,567 0 2 | 12,055 6 1 |

| RECEIPTS.                                                              |           | 1877.      | 1876.        |
|------------------------------------------------------------------------|-----------|------------|--------------|
| Brought over, Rs. 32,248 13                                            |           | 8          | 1,79,412 5 9 |
| <b>INTEREST ON VESTED FUND.</b>                                        |           |            |              |
| Received interest on Government Securities from the Bank of Bengal, .. | 7,583 0 0 | 7,583 0 0  |              |
| <b>DR. STOLICZKA MEMORIAL FUND.</b>                                    |           |            |              |
| Received Subscription to the Fund, ..                                  | 16 0 0    | 16 0 0     | 181 0 0      |
| <b>DR. OLDHAM MEMORIAL FUND.</b>                                       |           |            |              |
| Received Subscription to the Fund, ..                                  | 1,068 0 0 | 1,068 0 0  | 156 0 0      |
| <b>PIDDINGTON PENSION FUND.</b>                                        |           |            |              |
| Received interest on Government Security for Rs. 500, ..               | 27 8 0    | 27 8 0     | 630 12 0     |
| <b>COIN FUND.</b>                                                      |           |            |              |
| Sale proceeds of a Gold Coin, ..                                       | 17 0 0    | 17 0 0     |              |
| Bank of Bengal Fund account, ..                                        |           | 1,000 0 0  |              |
| Refund of Postage and Miscellaneous, ..                                |           | 1,033 11 0 | 4,122 3 0    |

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Carried over, Rs. 42,994 0 8 1,84,502 4 9

## DISBURSEMENTS.

1877.

1876.

Brought over, Rs.

12,567 0 2 12,055 6 1

## ESTABLISHMENT.

Paid Establishment, .. .. 3,991 0 0

3,991 0 0

## CONTINGENT CHARGES.

|                                                                                                               |     |    |   |
|---------------------------------------------------------------------------------------------------------------|-----|----|---|
| Paid Commission on Subscriptions collected, .. ..                                                             | 44  | 11 | 3 |
| Ditto Purchase of Postage Stamps, ..                                                                          | 141 | 2  | 6 |
| Ditto Insufficient and Bearing Postage, ..                                                                    | 1   | 6  | 0 |
| Ditto Meeting charges, .. ..                                                                                  | 270 | 10 | 0 |
| Ditto Advertising charges, .. ..                                                                              | 67  | 5  | 6 |
| Ditto Printing charges, .. ..                                                                                 | 314 | 6  | 2 |
| Ditto Pension to Islam Khan, .. ..                                                                            | 36  | 0  | 0 |
| Ditto Fee for Stamping Cheques, .. ..                                                                         | 3   | 2  | 0 |
| Ditto Stationery, .. ..                                                                                       | 202 | 0  | 0 |
| Ditto Binding Letter Files, .. ..                                                                             | 28  | 1  | 0 |
| Ditto Salary of Punkah Bearer, .. ..                                                                          | 34  | 10 | 9 |
| Ditto Purchase of Calcutta Directory, ..                                                                      | 14  | 0  | 0 |
| Ditto Subscription to the Army List, ..                                                                       | 19  | 0  | 0 |
| Ditto a copy of Indian Postal Guide, ..                                                                       | 1   | 0  | 0 |
| Ditto Carpenter for repairing and polishing Mahogany Table, .. ..                                             | 16  | 0  | 0 |
| Ditto Purchase of a Letter Copying Press, ..                                                                  | 34  | 2  | 6 |
| Ditto Petty charges, .. ..                                                                                    | 126 | 0  | 9 |
| Ditto Ticca Coolies for bringing Glass Cases from New Museum building, ..                                     | 11  | 8  | 6 |
| Ditto on account of Oldham Memorial Fund, towards cost of pedestal of bust, £7/10s., @ 1s. 8½d. per rupee, .. | 87  | 12 | 9 |

1,452 15 8 3,075 8 0

## FURNITURE AND FITTINGS.

|                                                                                  |       |    |   |
|----------------------------------------------------------------------------------|-------|----|---|
| Paid for 3 Teakwood large Glass Cases, ..                                        | 809   | 12 | 0 |
| Ditto 4 Teakwood Racks, .. ..                                                    | 244   | 0  | 0 |
| Ditto 3 ditto Pigeon-hole Almirahs, ..                                           | 390   | 0  | 0 |
| Ditto 2 ditto Glass door Book Cases, ..                                          | 182   | 12 | 0 |
| Ditto 4 ditto Writing Tables, .. ..                                              | 212   | 8  | 0 |
| Ditto 1 ditto Dressing Table, .. ..                                              | 45    | 4  | 0 |
| Ditto matting for stair-case, .. ..                                              | 105   | 0  | 0 |
| Ditto ditto plain ditto for room, .. ..                                          | 51    | 0  | 0 |
| Ditto ditto cane ditto for upstairs, ..                                          | 76    | 6  | 0 |
| Ditto purchase 7 new pole Punkahs, ..                                            | 346   | 6  | 0 |
| Ditto repairing and regilding picture frames, .. ..                              | 2,062 | 5  | 6 |
| Ditto supplying wooden cleats, chains, and fixing tickets to picture frames, ..  | 100   | 0  | 0 |
| Ditto G. G. Palmer, for cleaning and repairing paintings, .. ..                  | 1,592 | 0  | 0 |
| Ditto Messrs. J. M. Edmond and Co. for supplying Writing Tables, Chairs, &c., .. | 1,222 | 0  | 0 |
| Ditto J. B. Norton, for Gas fittings, ..                                         | 591   | 4  | 0 |
| Ditto repairing and polishing Chiffoniers, ..                                    | 21    | 4  | 0 |
| Ditto repairing and painting 4 Busts, ..                                         | 20    | 0  | 0 |
| Ditto removing and fixing 2 Pedestals and Asoka Inscription, .. ..               | 30    | 0  | 0 |
| Ditto gilding letters on 2 marble Slabs, ..                                      | 24    | 2  | 0 |

8,125 15 6 2,361 14 0

Carried over, Rs.

26,136 15 4 17,492 12 1

## RECEIPTS.

1877.

1876.

Brought over, Rs. 42,994 0 8 1,84,502 4 9

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 Rs. 42,994 0 8 1,84,502 4 9
 

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Examined and found correct.

DAVID WALDIE,  
J. BLACKBURN.ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1878.

## DISBURSEMENTS.

1877.

1876.

Brought over, Rs. 26,136 15 4 17,492 12 1

## VESTED FUND.

Paid Commission on selling Government

|                                           |    |    |    |   |
|-------------------------------------------|----|----|----|---|
| Securities for Rs. 17,000,..              | .. | 43 | 12 | 1 |
| Ditto Brokerage on ditto ditto,           | .. | 21 | 4  | 0 |
| Ditto Fee on renewing Govt. Securities,.. | .. | 13 | 0  | 0 |
| Ditto cost of receipt Stamp,              | .. | 0  | 8  | 0 |

78 8 1 1,50,962 0 10

## INTEREST ON VESTED FUND.

Paid Commission on collecting interest on

Government Securities, .. .. 18 15 2

18 15 2

## BUILDING.

Paid Messrs. Mackintosh, Burn and Co.

in full for repairing the Society's Pre-

mises, .. .. 7,569 13 6

7,569 13 6 10,039 7 6

## TAXES.

|                                 |    |     |   |   |
|---------------------------------|----|-----|---|---|
| Paid Police and Lighting rates, | .. | 192 | 0 | 0 |
| Ditto House rate,               | .. | 342 | 0 | 0 |
| Ditto Water rate,               | .. | 216 | 0 | 0 |

750 0 0

## COIN FUND.

|                              |    |     |    |   |
|------------------------------|----|-----|----|---|
| Purchase of 12 Gold Coins,.. | .. | 221 | 0  | 0 |
| Postage,                     | .. | 0   | 10 | 0 |

221 10 0 81 13 0

## DR. OLDHAM MEMORIAL FUND.

Remitted to Dr. G. E. Dobson, a draft

for £50, @ 1/8½d. per rupee, .. 592 9 6

Ditto ditto a draft for £52, @ 1s. 9d., .. 594 4 3

Ditto for advertising charges, .. 9 4 0

1,196 1 9 25 8 0

## DR. STOLICZKA MEMORIAL FUND.

Paid freight, landing charges, &amp;c. on two

cases from London, .. .. 20 15 3

20 15 3 658 10 9

## PIDDINGTON PENSION FUND.

Paid Commission on collecting interest

on Government Security, .. 0 1 2

0 1 2 560 0 10

Bank of Bengal Fund account, .. .. 800 0 0

O. P. Fund, .. .. 1,000 0 0

Cons. of Sans. MSS., .. .. 1,000 0 0

Postage and Miscellaneous expenses, .. .. 1,075 15 9 2,633 14 9

## BALANCE.

In the Bank of Bengal, viz.—

Account of Stoliczka Memorial Fund, 329 11 2

Account of Dr. Oldham Memorial Fund, 2 6 3

Account of Piddington Pension Fund, 98 2 0

Account of Asiatic Society of Bengal, 2,537 14 8

2,968 2 1

Cash in hand, .. .. 156 14 7

3,125 0 8 3,968 1 0

Rs. 42,994 0 8 1,86,422 4 9

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1878.

Examined and found correct,  
J. BLACKBURN.  
DAVID WALDIE.

# STATEMENT, *Abstract of the Cash Account,*

|                                                                                                      | RECEIPTS.         | 1877.      | 1876. |
|------------------------------------------------------------------------------------------------------|-------------------|------------|-------|
| <b>BALANCE OF 1876.</b>                                                                              |                   |            |       |
| In the Bank of Bengal, viz.                                                                          |                   |            |       |
| Dr. J. Muir's a/c., ..                                                                               | 898 10 0          |            |       |
| O. P. Fund, ..                                                                                       | 2,140 12 10       |            |       |
|                                                                                                      | <u>3,039 6 10</u> |            |       |
| Cash in hand, ..                                                                                     | 113 12 4          |            |       |
|                                                                                                      | <u>3,153 3 2</u>  | 4,407 9 11 |       |
| <b>ORIENTAL PUBLICATIONS.</b>                                                                        |                   |            |       |
| Received by Sale of Bibliotheca Indica and<br>by Subscription to ditto, ..                           | 2,317 7 6         |            |       |
| Ditto Refund of Postage and packing, ..                                                              | 61 10 9           |            |       |
|                                                                                                      | <u>2,379 2 3</u>  | 2,507 13 3 |       |
| <b>GOVERNMENT ALLOWANCE.</b>                                                                         |                   |            |       |
| Received from General Treasury, at 500 Rs.<br>per month, ..                                          | 6,000 0 0         |            |       |
| Ditto ditto Additional grant for the pub-<br>lication of Sanskrit Works, at 250 Rs. per<br>month, .. | 3,000 0 0         |            |       |
|                                                                                                      | <u>9,000 0 0</u>  | 9,000 0 0  |       |
| <b>CUSTODY OF ORIENTAL WORKS.</b>                                                                    |                   |            |       |
| Received Fine, ..                                                                                    | 8 8 0             |            |       |
|                                                                                                      | <u>8 8 0</u>      | 30 14 3    |       |
| <b>LIBRARY.</b>                                                                                      |                   |            |       |
| Received by transfer from Asiatic Society the<br>amount paid for Cataloguing the Persian<br>MSS., .. | 134 11 3          |            |       |
|                                                                                                      | <u>134 11 3</u>   |            |       |
| Asiatic Society of Bengal, ..                                                                        | 1,000 0 0         |            |       |
| Babu Braj Bhushana Dass, ..                                                                          | 3 5 0             |            |       |
| Babu Ram Jivan Mukerjee, ..                                                                          | 15 0 0            |            |       |
| A. Krishnaiger, Esq., ..                                                                             | 1 2 0             |            |       |
| Babu Mehr Chand, ..                                                                                  | 3 2 3             |            |       |
| Babu Hara Chandra Chaudhuri, ..                                                                      | 1 12 0            |            |       |
| C. J. Adams, Esq., ..                                                                                | 3 3 0             |            |       |
| The Government N. W. Provinces, ..                                                                   | 1,518 0 0         |            |       |
| P. Peterson, Esq., ..                                                                                | 8 1 0             |            |       |
|                                                                                                      | <u>2,553 9 3</u>  | 219 8 6    |       |

Carried over, Rs. 17,229 1 11 16,165 13 11

## No. 2.

*Oriental Publication Fund, 1877.*

| DISBURSEMENTS.                                                 |    |       |    | 1877.  | 1876. |       |       |
|----------------------------------------------------------------|----|-------|----|--------|-------|-------|-------|
| ORIENTAL PUBLICATIONS.                                         |    |       |    |        |       |       |       |
| Paid for Advertising charges,                                  | .. | 240   | 0  | 0      |       |       |       |
| Ditto Engraving charges,                                       | .. | 16    | 0  | 0      |       |       |       |
| Ditto Packing Charges,                                         | .. | 6     | 0  | 0      |       |       |       |
| Ditto Postage Stamps,                                          | .. | 120   | 9  | 6      |       |       |       |
| Ditto Freight for sending books,                               | .. | 109   | 1  | 0      |       |       |       |
| Ditto Commission on collecting bills,                          | .. | 1     | 11 | 0      |       |       |       |
| Ditto Coolies for removing books and Shelves,                  | .. | 10    | 2  | 8      |       |       |       |
| Ditto Extra man for counting and arranging Bibliotheca Indica, | .. | 9     | 8  | 0      |       |       |       |
| Purchase of two Teakwood racks,                                | .. | 122   | 0  | 0      |       |       |       |
| Ditto Petty Charges,                                           | .. | 3     | 2  | 0      |       |       |       |
|                                                                |    |       |    |        | 638   | 1     | 9     |
|                                                                |    |       |    |        |       | 753   | 13    |
|                                                                |    |       |    |        |       |       | 9     |
| CUSTODY OF ORIENTAL WORKS.                                     |    |       |    |        |       |       |       |
| Paid Salary of the Librarian,                                  | .. | 600   | 0  | 0      |       |       |       |
| Ditto Establishment,                                           | .. | 724   | 0  | 0      |       |       |       |
| Ditto fee for Stamping Cheques,                                | .. | 3     | 2  | 0      |       |       |       |
| Ditto book-binding charges,                                    | .. | 7     | 4  | 0      |       |       |       |
|                                                                |    |       |    |        | 1,334 | 6     | 0     |
|                                                                |    |       |    |        |       | 1,332 | 12    |
|                                                                |    |       |    |        |       |       | 0     |
| LIBRARY.                                                       |    |       |    |        |       |       |       |
| Paid Salary for Cataloguing Persian Library,                   | .. | 131   | 3  | 3      |       |       |       |
| Ditto Purchase of MSS.,                                        | .. | 266   | 10 | 6      |       |       |       |
|                                                                |    |       |    |        | 397   | 13    | 9     |
|                                                                |    |       |    |        |       | 70    | 0     |
|                                                                |    |       |    |        |       |       | 0     |
| CATALOGUE OF SANSKRIT MSS.                                     |    |       |    |        |       |       |       |
| Paid Salary for Cataloguing Sanskrit MSS.,                     | .. | 480   | 0  | 0      |       |       |       |
|                                                                |    |       |    |        | 480   | 0     | 0     |
|                                                                |    |       |    |        |       | 420   | 0     |
|                                                                |    |       |    |        |       |       | 0     |
| GOBHILĪYA GRIHYA SŪTRA.                                        |    |       |    |        |       |       |       |
| Paid Postage Stamps,                                           | .. | 1     | 0  | 0      |       |       |       |
|                                                                |    |       |    |        | 1     | 0     | 0     |
|                                                                |    |       |    |        |       | 224   | 13    |
|                                                                |    |       |    |        |       |       | 0     |
| ĀIN-I-AKBARĪ.                                                  |    |       |    |        |       |       |       |
| Paid Editing and Printing charges,                             | .. | 1,028 | 0  | 0      |       |       |       |
| Ditto Lithographing and Printing charges,                      | .. | 209   | 4  | 0      |       |       |       |
| Ditto Copying charges,                                         | .. | 30    | 0  | 0      |       |       |       |
| Ditto preparing an index,                                      | .. | 65    | 0  | 0      |       |       |       |
|                                                                |    |       |    |        | 1,332 | 4     | 0     |
|                                                                |    |       |    |        |       | 445   | 0     |
|                                                                |    |       |    |        |       |       | 0     |
| AKBARNĀMAH.                                                    |    |       |    |        |       |       |       |
| Paid Editing and Printing charges,                             | .. | 2,558 | 2  | 0      |       |       |       |
| Ditto binding charges,                                         | .. | 5     | 0  | 0      |       |       |       |
|                                                                |    |       |    |        | 2,563 | 2     | 0     |
|                                                                |    |       |    |        |       | 192   | 0     |
|                                                                |    |       |    |        |       |       | 0     |
| SĀMAVEDA SANHITĀ.                                              |    |       |    |        |       |       |       |
| Paid Editing and Printing charges,                             | .. | 3,281 | 9  | 0      |       |       |       |
|                                                                |    |       |    |        | 3,281 | 9     | 0     |
|                                                                |    |       |    |        |       | 2,100 | 8     |
|                                                                |    |       |    |        |       |       | 9     |
| Carried over, Rs.                                              |    |       |    | 10,028 | 4     | 6     | 5,538 |
|                                                                |    |       |    |        |       | 13    | 6     |

| RECEIPTS.         | 1877.       | 1876.        |
|-------------------|-------------|--------------|
| Brought over, Rs. | 17,229 1 11 | 16,165 13 11 |

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|        |             |              |
|--------|-------------|--------------|
| Rs. .. | 17,229 1 11 | 16,165 13 11 |
|--------|-------------|--------------|

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Examined and found correct.  
J. BLACKBURN.  
DAVID WALDIE.

ASIATIC SOCIETY'S ROOMS,  
*Calcutta, Jan. 1st., 1878.*



| DISBURSEMENTS.                     |    |       |      | 1877.  |        |      | 1876.  |    |   |
|------------------------------------|----|-------|------|--------|--------|------|--------|----|---|
| Brought over, Rs.                  |    |       |      | 10,028 | 4      | 6    | 5,538  | 13 | 6 |
| <b>BIOGRAPHICAL DICTIONARY.</b>    |    |       |      |        |        |      |        |    |   |
| Paid Editing and Printing charges, | .. | 352   | 0 0  |        |        |      |        |    |   |
| Ditto Copying charges,             | .. | 12    | 4 0  |        |        |      |        |    |   |
|                                    |    |       |      | 364    | 4      | 0    | 838    | 0  | 0 |
| <b>CHATURVARGA CHINTÁMANI.</b>     |    |       |      |        |        |      |        |    |   |
| Paid Editing and Printing charges, | .. | 1,845 | 11 0 |        |        |      |        |    |   |
|                                    |    |       |      | 1,845  | 11     | 0    | 1,220  | 0  | 0 |
| <b>TABAQÁT-I-NÁCIRÍ.</b>           |    |       |      |        |        |      |        |    |   |
| Paid Printing charges,             | .. | 821   | 14 7 |        |        |      |        |    |   |
|                                    |    |       |      | 821    | 14     | 7    | 1,085  | 5  | 6 |
| <b>BHÁMATÍ.</b>                    |    |       |      |        |        |      |        |    |   |
| Paid Printing charges,             | .. | 332   | 0 0  |        |        |      |        |    |   |
| Ditto Freight,                     | .. | 11    | 8 0  |        |        |      |        |    |   |
|                                    |    |       |      | 343    | 8      | 0    | 515    | 9  | 3 |
| <b>AGNI PURÁNA.</b>                |    |       |      |        |        |      |        |    |   |
| Paid Editing and Printing charges, | .. | 735   | 10 0 |        |        |      |        |    |   |
|                                    |    |       |      | 735    | 10     | 0    |        |    |   |
| <b>MIMÁÑSÁ DARSANA.</b>            |    |       |      |        |        |      |        |    |   |
| Paid Editing and Printing charges, | .. | 326   | 6 0  |        |        |      |        |    |   |
|                                    |    |       |      | 326    | 6      | 0    |        |    |   |
| Babu Braj Bhusan Dass,             | .. | 2     | 11 6 |        |        |      |        |    |   |
| Babu Mehr Chand,                   | .. | 0     | 2 6  |        |        |      |        |    |   |
| Sheoprosad Sardar,                 | .. | 2     | 7 0  |        |        |      |        |    |   |
| The Government N. W. Provinces,    | .. | 18    | 0 0  |        |        |      |        |    |   |
| Dr. G. Bühler,                     | .. | 0     | 4 0  |        |        |      |        |    |   |
| C. J. Adams, Esq.,                 | .. | 3     | 3 3  |        |        |      |        |    |   |
| P. Peterson, Esq.,                 | .. | 8     | 1 0  |        |        |      |        |    |   |
|                                    |    |       |      | 34     | 13     | 3    | 1,191  | 0  | 3 |
| <b>BALANCE.</b>                    |    |       |      |        |        |      |        |    |   |
| In the Bank of Bengal, viz.        |    |       |      |        |        |      |        |    |   |
| Dr. J. Muir's a/c.,                | .. | 898   | 10 0 |        |        |      |        |    |   |
| The Government N. W. P.            |    |       |      |        |        |      |        |    |   |
| for Beal's Oriental Dic-           |    |       |      |        |        |      |        |    |   |
| tionary a/c.,                      | .. | 1,500 | 0 0  |        |        |      |        |    |   |
| O. P. Fund a/c.,                   | .. | 129   | 7 1  |        |        |      |        |    |   |
|                                    |    |       |      | 2,528  | 1      | 1    |        |    |   |
| Cash in hand,                      | .. |       |      | 200    | 9      | 6    |        |    |   |
|                                    |    |       |      | 2,728  | 10     | 7    | 3,153  | 3  | 2 |
|                                    |    |       |      | Rs. .. | 17,229 | 1 11 | 13,541 | 15 | 8 |

Examined and found correct.

J. BLACKBURN.

DAVID WALDIE.

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st., 1878.

# STATEMENT, *Conservation of Sanskrit MSS., in Account*

| Cr.                                                                                                                                       |            | 1877.      | 1876.      |
|-------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|
| <b>BALANCE OF 1876.</b>                                                                                                                   |            |            |            |
| In the Bank of Bengal, .....                                                                                                              | 2,146 10 5 |            |            |
| Cash in hand, .....                                                                                                                       | 3 14 6     |            |            |
|                                                                                                                                           | <hr/>      | 2,150 8 11 | 4,370 0 11 |
| Received from the Government of Bengal, the<br>amount sanctioned towards the Conservation<br>of Sanskrit MSS., being 2nd half of 1876-77, | 1,600 0 0  |            |            |
| Ditto ditto 1st half of 1877-78, .....                                                                                                    | 1,600 0 0  |            |            |
| Sale proceeds of 32 copies Notices of Sanskrit<br>MSS., .....                                                                             | 32 0 0     |            |            |
| Refund of Postage Stamps, .....                                                                                                           | 0 10 0     |            |            |
| Refund of the amount from Pandita Rama-<br>natha Turkaratna paid on the 16th April<br>1877 for purchase of Sanskrit MSS., .....           | 250 0 0    |            |            |
| Ditto fine of bearer's salary, .....                                                                                                      | 7 8 0      |            |            |
| Received from Asiatic Society of Bengal, ....                                                                                             | 1,000 0 0  |            |            |
|                                                                                                                                           | <hr/>      | 4,490 2 0  | 5,447 15 0 |

Rs. 6,640 10 11 9,817 15 11

Examined and found correct.

J. BLACKBURN.

DAVID WALDIE,

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1878.

No. 3.

*Current with the Asiatic Society of Bengal.*

| Dr.                                                                              |       |    | 1877.     | 1876.             |
|----------------------------------------------------------------------------------|-------|----|-----------|-------------------|
| Paid Salary for preparing Catalogue of Sanskrit MSS., .....                      | 360   | 0  | 0         |                   |
| Ditto ditto for Translating ditto, .....                                         | 240   | 0  | 0         |                   |
| Ditto ditto for Travelling Pandit, .....                                         | 650   | 0  | 0         |                   |
| Ditto Contingent charges for Travelling Pandit, .....                            | 4     | 8  | 0         |                   |
| Ditto Travelling Allowance for ditto ditto, ..                                   | 62    | 8  | 0         |                   |
| Ditto Copying charges for Sanskrit MSS., ..                                      | 74    | 8  | 9         |                   |
| Ditto Printing charges of Sanskrit MSS. Vol. IV. Part I. No. XII., .....         | 329   | 12 | 0         |                   |
| Ditto ditto for Descriptive Catalogue of Sanskrit MSS., .....                    | 874   | 4  | 0         |                   |
| Ditto Dr. Rájendralála Mitra, as an advance for purchase of Sanskrit MSS., ..... | 2,400 | 0  | 0         |                   |
| Ditto Pandita Ramanatha Turkaratna for ditto ditto, .....                        | 250   | 0  | 0         |                   |
| Ditto Purchase of Stationery, .....                                              | 15    | 12 | 0         |                   |
| Ditto Fee to the Bank of Bengal for Stamping Cheques, .....                      | 1     | 9  | 0         |                   |
| Ditto Purchase of Sanskrit MSS., .....                                           | 323   | 0  | 0         |                   |
| Ditto Paste-board for ditto, .....                                               | 96    | 7  | 9         |                   |
| Ditto Kheroah cloth for ditto, .....                                             | 123   | 12 | 0         |                   |
| Ditto Tape for ditto, .....                                                      | 11    | 2  | 6         |                   |
| Ditto Librarian, his Salary from May 1876 to April 1877, .....                   | 150   | 0  | 0         |                   |
| Ditto Purchase of 2 Teak-wood Glass-door book-cases, .....                       | 182   | 12 | 0         |                   |
| Ditto Salary for Bearer, .....                                                   | 84    | 0  | 0         |                   |
| Ditto Binding charges for Sanskrit MSS., ..                                      | 19    | 12 | 0         |                   |
| Ditto Postage Stamps, .....                                                      | 12    | 9  | 0         |                   |
| Ditto Freight for Sanskrit MSS., .....                                           | 1     | 7  | 0         |                   |
| Ditto Telegram sent to Babu Harish Chandra at Benares, .....                     | 6     | 0  | 0         |                   |
| Ditto for 1 Stamp, .....                                                         | 4     | 0  | 0         |                   |
| Ditto Petty Charges, .....                                                       | 13    | 14 | 9         |                   |
|                                                                                  |       |    | 6,291     | 10 9 7,667 7 0    |
| BALANCE OF 1877.                                                                 |       |    |           |                   |
| In the Bank of Bengal, .....                                                     | 312   | 0  | 2         |                   |
| Cash in hand, .....                                                              | 37    | 0  | 0         |                   |
|                                                                                  |       |    | 349       | 0 2 2,150 8 11    |
|                                                                                  |       |    | Rs. 6,640 | 10 11 9,817 15 11 |

Examined and found correct.

J. BLACKBURN.

DAVID WALDIE.

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1878.

*Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st January, 1878.*

**We have examined this account and see no reason to doubt its correctness.**

**ASIATIC SOCIETY'S ROOMS,**  
*Calcutta, Jan. 1st, 1878.*

**J. BLACKBURN.**  
**DAVID WALDIE.**

**STATEMENT NO. 8.**

*Shewing the Assets and Liabilities of the Asiatic Society of Bengal,  
O. P. Fund, on the 1st January, 1878.*

[illegible]

**We have examined this account and see no reason to doubt its correctness.**

ASIATIC SOCIETY'S ROOMS,  
Calcutta, Jan. 1st, 1878.

**J. BLACKBURN.**  
**DAVID WALDIE.**



[APPENDIX.]

LIST OF MEMBERS  
OF THE  
ASIATIC SOCIETY OF BENGAL.  
ON THE 31ST DECEMBER 1877.

# LIST OF ORDINARY MEMBERS.

R = Resident. N. R. = Non-Resident. N. S. = Non-Subscribing.

L. M. = Life Members. F. M. = Foreign Member.

N. B.—Members who have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Members who are about to leave India and do not intend to return, are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with Rule 40 of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

| Date of Election. |      |                                                                                                     |
|-------------------|------|-----------------------------------------------------------------------------------------------------|
| 1860 Dec. 5.      | R.   | Abdul-Latíf, Khán Bahádúr, Maulawí. <i>Calcutta</i> .                                               |
| 1868 Sept. 2.     | N.S. | Adam, R. M. <i>Europe</i> .                                                                         |
| 1860 July 4.      | N.R. | Ahmad Khán Bahádúr, Sayyid, c. s. i. <i>Benares</i> .                                               |
| 1872 April 3.     | N.R. | Ahsan-ullah, Nawáb. <i>Dacca</i> .                                                                  |
| 1860 April 4.     | N.R. | Aitchison, J. E. T., M. D. <i>Jullundur</i> .                                                       |
| 1871 June 7.      | N.R. | Alexander, J. W., Tutor to minor Rájá of Darbhanga.<br><i>Darbhanga, Tirhut</i> .                   |
| 1866 Jan. 17.     | N.S. | Allan, Lieut.-Col. A. S. <i>Europe</i> .                                                            |
| 1860 Oct. 3.      | R.   | Amír Alí, Khán Bahádúr, Nawáb. <i>Calcutta</i> .                                                    |
| 1874 June 3.      | R.   | Amír Alí, Sayyid, Barrister at Law, High Court.<br><i>Calcutta</i> .                                |
| 1865 Jan 11.      | R.   | Anderson, John, M. D., F. L. S., Superintendent, Indian<br>Museum. <i>Calcutta</i> .                |
| 1872 June 5.      | F.M. | Anderson, A. <i>Europe</i> . (care of Messrs. Colvin,<br><i>Cowie &amp; Co. Calcutta</i> .)         |
| 1875 June 2.      | R.   | Apcar, J. G., Barrister at Law. <i>Calcutta</i> .                                                   |
| 1875 Feb. 3.      | R.   | Armstrong, J., Surgeon, B. Army. <i>Calcutta</i> .                                                  |
| 1877 June 6.      | R.   | Arnold, Henry Kerchever Walter, Asst. Secretary,<br>Indian Museum. <i>Calcutta</i> .                |
| 1877 July 4.      | R.   | Ashgar Ali Khan, Nawab Diler Jang Bahádúr, c. s. i.<br><i>Calcutta</i> .                            |
| • 1871 Sept. 6.   | N.R. | Atkinson, Edwin Felix Thomas, B. A., c. s., Offg. Acct.<br>General, N. W. P. <i>Allahabad</i> .     |
| 1869 Feb. 3.      | N.R. | Attar Singh Bahádúr, Sirdár., M. U. F. Chief of<br>Bhadour. <i>Ludiana</i> .                        |
| 1870 Feb. 2.      | N.R. | Baden-Powell, Baden Henry, c. s., Conservator of<br>Forests. <i>Lahore</i> .                        |
| • 1873 Aug. 6.    | N.R. | Badgley, Major William Francis, s. c., Offg. Deputy<br>Superintendent of Surveys. <i>Shillong</i> . |
| 1862 Feb. 5.      | R.   | Baisák, Gaurdás, Bábu, Depy. Magistrate. <i>Serampur</i> .                                          |



| Date of Election. |      |                                                                                                                                                            |
|-------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1865 Nov. 7.      | N.R. | Ball, Valentine, M. A., F. G. S., Geol. Survey of India. <i>Geological Survey Office, Calcutta.</i>                                                        |
| 1860 Nov. 1.      | R.   | Banerjea, Rev. Kristno Mohun, LL. D. <i>Calcutta.</i>                                                                                                      |
| 1876 June 7.      | R.   | Baness, John Frederick, Chief Draftsman, Surveyor General's Office. <i>Calcutta.</i>                                                                       |
| 1873 Mar. 5.      | N.S. | Barclay, G. W. W., M. A. <i>Europe.</i>                                                                                                                    |
| 1869 Dec. 1.      | N.R. | Barker, R. A., M. A., Civil Surgeon. <i>Bogra.</i>                                                                                                         |
| • 1860 July 4.    | R.   | Batten, George Henry Maxwell, C. S., Barrister at Law, Offg. Secretary to the Govt. of India, Dept. of Revenue, Agriculture and Commerce. <i>Calcutta.</i> |
| • 1859 May 4.     | R.   | Bayley, Edward Clive, The Hon. Sir, B. C. S., K. C. S. I., C. I. E. <i>Calcutta.</i>                                                                       |
| 1873 Feb. 5.      | R.   | Bayne, R. R., M. R. I. B. A., Draughtsman, Chief Engineer's Office, E. I. Railway. <i>Calcutta.</i>                                                        |
| • 1864 Sept. 7    | N.R. | Beames, John, B. C. S., Magistrate and Collector. <i>Chittagong.</i>                                                                                       |
| • 1841 April 7.   | N.S. | Beaufort, F. L., B. C. S., (retired). 62, <i>Montague Square, Hyde Park, London.</i>                                                                       |
| 1876 June 7.      | N.R. | Behrendt, J., Asst. Professor, Patna College. <i>Patna.</i>                                                                                                |
| 1867 July 3.      | R.   | Belletty, N. A., Surveyor General's Office. <i>Calcutta.</i>                                                                                               |
| • 1862 Oct. 8.    | R.   | Bernard, Charles Edward, C. S., Offg. Addl. Secy. to the Govt. of India. <i>Calcutta.</i>                                                                  |
| • 1872 Aug. 7.    | R.   | Beverley, Henry, M. A., C. S., Offg. District and Sessions Judge, 24-Pergunnahs. <i>Calcutta.</i>                                                          |
| • 1876 Nov. 15.   | N.R. | Beveridge, Henry, C. S., District and Sessions Judge. <i>Rangpur.</i>                                                                                      |
| 1875 July 7.      | N.R. | Black, F. C., Asst. Engineer. <i>Hamirpur, N. W. P.</i>                                                                                                    |
| 1873 Dec. 3.      | R.   | Blackburn, J., Manager, Oriental Gas Company. <i>Calcutta.</i>                                                                                             |
| 1857 Mar. 4.      | R.   | Blanford, H. F., A. R. S. M., F. G. S. Meteorological Reporter, Govt. of India. <i>Calcutta.</i>                                                           |
| 1859 Aug. 3.      | R.   | Blanford, W. T., A. R. S. M., F. R. S., F. G. S. Depy. Supdt. Geological Survey of India. <i>Geological Survey Office, Calcutta.</i>                       |
| 1873 Aug. 6.      | N.R. | Bligh, W. G., Asst. Engineer, P. W. D. <i>Agra.</i>                                                                                                        |
| 1873 April 2.     | R.   | Blissett, T., Superintendent Telegraph Stores <i>Alipur.</i>                                                                                               |
| 1864 April 6.     | R.   | Blochmann, Henry, M. A., Principal of the Madrasah. <i>Calcutta.</i>                                                                                       |
| • 1877 May 2.     | R.   | Bourdillon, James Austin, C. S., Offg. Inspector General of Registration. <i>Calcutta.</i>                                                                 |
| 1876 Nov. 15.     | N.S. | Bowie, Major M. M. <i>Europe.</i>                                                                                                                          |
| • 1868 Jan. 15.   | N.R. | Boxwell, John, C. S., Magistrate and Collector. <i>Dumka, Sonthal Pergunnahs.</i>                                                                          |
| 1876 May 4.       | R.   | Bradshaw, A. F., Surgeon Major, Surgeon to the Commander-in-Chief. <i>Calcutta.</i>                                                                        |
| 1860 Mar. 7.      | R.   | Brandis, Dietrich, PH. D., Inspector General of Forests. <i>Calcutta.</i>                                                                                  |
| 1872 June 5.      | R.   | Brooks, W. E., C. E., Supdg. Engineer, E. I. Railway. <i>Howrah.</i>                                                                                       |

| Date of Election. |      |                                                                                                                                         |
|-------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1871 Jan. 4.      | R.   | Brough, R. S., Offg. Electrician, Telegraph Store Department. <i>Calcutta.</i>                                                          |
| 1866 Nov. 7.      | N.R. | †Browne, Col. Horace Albert, Commissioner of Pegu. <i>Rangoon.</i>                                                                      |
| 1871 Sept. 6.     | N.R. | Buckle, H., Deputy Commissioner. <i>Toung-hoo, Burmah.</i>                                                                              |
| • 1869 Jan. 20.   | N.R. | Cadell, Alan, B. A., c. s., Settlement Officer. <i>Banda.</i>                                                                           |
| 1863 June 3.      | N.S. | Campbell, Sir George, K. C. S. I. <i>Europe.</i>                                                                                        |
| 1873 Mar. 5.      | R.   | Cappel, A. J. L., Depy. Director General of Telegraphs. <i>Calcutta.</i>                                                                |
| • 1876 Aug. 2.    | N.R. | Carnegy, P. T., Offg. Political Agent and Depy. Commissioner of Naga Hills. Samaguting. <i>Assam.</i>                                   |
| 1876 Nov. 15.     | R.   | Cayley, Surgeon-Major H., Surgeon, Mayo Native Hospital. <i>Calcutta.</i>                                                               |
| 1875 April 4.     | R.   | Chambers, Dr. E. W. <i>Calcutta.</i>                                                                                                    |
| 1868 Aug. 5.      | N.R. | Chandramohan Gosvámi, Pandit. <i>Gauhati.</i>                                                                                           |
| 1861 March 1.     | N.R. | Chaudhuri, Harachandra Bábu, Zamindar. <i>Sherpur, Maimansingh.</i>                                                                     |
| 1874 Aug. 5.      | N.S. | Chennell, A. W., Asst. Surveyor, Survey Dept. <i>Europe.</i>                                                                            |
| 1875 June 2.      | N.R. | Chennell, T., Manager, Eastern Assam Tea Co. Ltd. <i>Dibrughar, Assam.</i>                                                              |
| 1871 Sept. 6.     | N.R. | Chisholm, R. F. <i>Bombay.</i>                                                                                                          |
| • 1868 Feb. 5.    | N.R. | Clark, Lieut.-Col. Edgar Gibson, s. c., Asst. Commissioner. <i>Kheri, Oudh.</i>                                                         |
| 1877 Aug. 30.     | R.   | Clarke, Capt. Henry Wilberforce, R. E., Depy. Consulting Engr., Govt. of India, for Guaranteed Railways. <i>Calcutta.</i>               |
| 1872 Aug. 7.      | N.R. | Clutterbuck, Capt. T. St. Quintin., Wing Commander 29th N. I. <i>Tullagong.</i>                                                         |
| • 1877 Mar. 7.    | R.   | Colvin, The Hon. Bazett Wetenhall, c. s., Member of the Governor General's Council. <i>Calcutta.</i>                                    |
| 1874 Nov. 4.      | N.R. | Constable, Archibald, Asst. Engineer, Railway Dept. <i>Lucknow.</i>                                                                     |
| 1868 Dec. 2.      | R.   | Cooke, J. E., Asst. Comptroller General. <i>Calcutta.</i>                                                                               |
| • 1874 July 1.    | N.R. | Cowan, Capt. Samuel Hunter, s. c., Asst. Supdt. Soane Irrigation Survey, Behar. <i>Hazáribágh.</i>                                      |
| 1876 Mar. 1.      | R.   | Crawfurd, James, B. A., c. s., Barrister at Law, Offg. Registrar High Court. <i>Calcutta.</i>                                           |
| 1877 June 6.      | R.   | Croft, A. W., M. A., Offg. Director of Public Instruction. <i>Calcutta.</i>                                                             |
| 1874 Mar. 4.      | N.R. | Crombie, Alexander, M. D., Civil Surgeon. <i>Dacca.</i>                                                                                 |
| 1877 Feb. 7.      | N.R. | Crooke, William, c. s., Offg. Joint Magistrate. <i>Gorákhpur.</i>                                                                       |
| • 1873 Aug. 6.    | R.   | Cunningham, David Douglas, M. B., Special Asst. to the Sanitary Commissioner with the Govt. of India. <i>Calcutta.</i>                  |
| 1847 June 2.      | F.M. | Dalton, Major General Edward Tuite, c. s. i., s. c. (retired). <i>Europe. (care of Messrs. Gillanders, Arbuthnot and Co. Calcutta.)</i> |

| Date of Election. |       |                                                                                                            |
|-------------------|-------|------------------------------------------------------------------------------------------------------------|
| • 1870 May 4.     | N.R.  | Damant, Guybon Henry, c. s., Offg. Depy. Commissioner. <i>Garro Hills.</i>                                 |
| • 1873 Dec. 3.    | N.R.  | Dames, Mansel Longworth, c. s., Asst. Commissioner. <i>Dera Ghazi Khan.</i>                                |
| 1864 Dec. 5.      | N.R.  | Dás, Gurucharan, Bábu. <i>Krishnagar.</i>                                                                  |
| 1865 June 7.      | N.R.  | Dás, Jaykissen, Bahádur, Rájá, c. s. I. <i>Cawnpore.</i>                                                   |
| 1871 June 7.      | R.    | Dás, Rámakrishna, Bábu. <i>Calcutta.</i>                                                                   |
| 1861 Nov. 6.      | F.M.  | Davies, Sir Robert Henry, K. C. S. I., C. S. <i>Europe.</i>                                                |
| 1869 April 7.     | F.M.  | Day, Dr. Francis, F. L. S., F. Z. S. <i>Europe.</i>                                                        |
| 1856 June 4.      | N.S.  | DeBourbel, Lieut.-Col. Raoul, R. E. <i>Europe.</i>                                                         |
| 1870 Feb. 2.      | N.R.  | DeFabeck, Surgeon-Major Frederick William Alexander, Deoli Irregular Force. <i>Deoli.</i>                  |
| 1872 Aug. 7.      | R.    | Dejoux, P., Executive Engineer, P. W. D. <i>Calcutta.</i>                                                  |
| 1869 Oct. 6.      | N.R.  | Delmerick, J. G., Extra Asst. Commissioner. <i>Delhi.</i>                                                  |
| 1873 Jan. 8       | N.R.  | Dennys, H. L., Dist. Supdt. of Police. <i>Sambalpur O. P.</i>                                              |
| 1862 May 7.       | N. R. | Dhanapati Singh Dughar, Raí Bahádur. <i>Azimganj.</i>                                                      |
| 1853 Sept. 7.     | N.S.  | Dickens, Major-General Craven Hildesley, B. A., C. S. I. <i>Europe.</i>                                    |
| 1870 May 4.       | F.M.  | Dobson, G. E., B. A., M. B., F. L. S., <i>Royal Victoria Hospital. Netley. Southampton.</i>                |
| 1875 Mar. 3.      | N.R.  | Dodgson, Walter. <i>Rangpur.</i>                                                                           |
| 1859 Sept. 7.     | N.R.  | Douglas, Major-General C., B. A. <i>Lucknow.</i>                                                           |
| 1875 Mar. 3.      | R.    | Douglas, J., Offg. Supdt. of Telegraphs. <i>Calcutta.</i>                                                  |
| 1867 June 5.      | N.R.  | Duthoit, William, c. s., Magistrate and Collector. <i>Shahjahanpur. N. W. P.</i>                           |
| 1873 Aug. 6.      | R.    | Dutt, Jogesh Chunder, Bábu. <i>Calcutta.</i>                                                               |
| 1877 Aug. 30.     | N.R.  | Dutt, Kedarnath, Bábu, Depy. Magistrate. <i>Bogra.</i>                                                     |
| 1869 June 2.      | N.R.  | Dutt, Udaychand, Bábu. <i>Furidpur.</i>                                                                    |
| 1873 April 2.     | R.    | Dutt, Umesh Chunder, Bábu. <i>Calcutta.</i>                                                                |
| 1870 Mar. 8.      | L.M.  | Edinburgh, H. R. H. The Duke of. <i>Europe.</i>                                                            |
| • 1863 May 6.     | N.R.  | Edgar, John Ware, c. s. I., c. s., Offg. Magistrate and Collector. <i>Shahabad. L. P.</i>                  |
| • 1874 Dec. 2.    | N.R.  | Egerton, The Hon. Robert Eyles, c. s., c. s. I., Lieut.-Governor of the Panjab. <i>Lahore.</i>             |
| 1871 Dec. 2.      | R.    | Eliot, J., M. A., Meteorological Reporter to Govt. of Bengal. <i>Calcutta.</i>                             |
| 1846 Jan. 7.      | N.S.  | Elliot, Sir Walter. <i>Wolfelee, Hawick.</i>                                                               |
| 1859 Nov. 2.      | N.R.  | Elliot, Charles Alfred, c. s., Special Duty. <i>Madras.</i>                                                |
| 1871 Oct. 4.      | N.R.  | Evezard, Col. G. E. <i>Púna.</i>                                                                           |
| 1863 Oct. 7.      | N.S.  | Ewart, Surgeon-Major J., M. D. <i>Europe.</i>                                                              |
| 1859 Dec. 7.      | R.    | Fath Alí, Maulawí. <i>Calcutta.</i>                                                                        |
| 1851 May 7.       | N.S.  | Fayrer, Sir Joseph, K. C. S. I. <i>Europe.</i>                                                             |
| 1863 Jan. 15.     | N.R.  | Fedden, Francis, Asst. Supdt. Geological Survey of India. <i>Geol. Survey Office. Calcutta.</i>            |
| 1876 Jan. 5.      | R.    | Feistmantel, Ottokar, M. D., Palæontologist, Geological Survey of India. <i>Calcutta.</i>                  |
| 1876 July 5.      | N.R.  | Foulkes, The Rev. Thos., Chaplain. <i>Bangalore.</i>                                                       |
| 1868 May 6.       | N.R.  | Field, Charles Dickenson, M. A., LL. D., c. s., Barrister at Law, District Sessions Judge. <i>Burdwan.</i> |

| Date of Election. |      |                                                                                                                        |
|-------------------|------|------------------------------------------------------------------------------------------------------------------------|
| 1869 Sept. 1.     | N.R. | Fisher, John Hadden, c. s., Depy. Commissioner. <i>Jabalpur.</i>                                                       |
| 1872 Dec. 4.      | N.R. | Forbes, Major John Greenlaw, R. E., Supdg. Engineer. S. W. Circle, Bengal. <i>Calcutta.</i>                            |
| 1875 Jan. 6.      | N.R. | Forbes, Capt. C. J. F., F. R. G. S. <i>Shwegyeen, B. Burma.</i>                                                        |
| 1861 Feb. 6.      | N.R. | Forest, R., c. E. <i>Dehra.</i>                                                                                        |
| 1869 Oct. 12.     | F.M. | Forlong, Lieut.-Col. J. G. R., M. S. C. 24, <i>St. James Square, London.</i>                                           |
| 1863 June 3.      | N.S. | Forsyth, Sir Thomas Douglas, c. s., K. C. S. I., C. B. <i>Europe.</i>                                                  |
| 1871 Nov. 1.      | N.R. | Foster, J. M., M. R. C. S., Medical Officer, Assam Co. <i>Nazira, Assam.</i>                                           |
| 1873 July 2.      | N.R. | Fraser, Capt. E., Asst. Resident. <i>Bussorah, Persian Gulf.</i>                                                       |
| • 1869 Sept. 1.   | N.R. | Fryer, Major G. E., Depy. Commissioner Thonkwa District. <i>Maobung, B. Burmah.</i>                                    |
| 1867 Sept. 4.     | R.   | Fyfe, The Rev. W. C., M. A., Principal, Free Church College. <i>Calcutta.</i>                                          |
| 1873 Dec. 3.      | N.R. | Gamble, J. S., B. A., Asst. to Inspector General of Forests. <i>Pankabári, Darjiling.</i>                              |
| 1871 Aug. 2.      | N.R. | Gangaprasad, Munshi, Depy. Collector. <i>Jaunpur.</i>                                                                  |
| • 1874 July 1.    | N.R. | Gardner, David Mason, c. s., Magistrate and Collector. <i>Azamgarh.</i>                                                |
| 1859 Aug. 3.      | L.M. | Gastrell, Major-General James Eardley, (retired). 17, <i>Loudon Road, Wimbledon, London, S. W.</i>                     |
| 1867 Dec. 4.      | R.   | Gay, E. Esq., M. A., c. s., Depy. Comptroller General. <i>Calcutta.</i>                                                |
| 1877 Aug. 30.     | R.   | Ghosha, Jnanendra Chandra Bábu. <i>Calcutta.</i>                                                                       |
| 1871 May 3.       | R.   | Ghosha, Káliprasanna Bábu. <i>Calcutta.</i>                                                                            |
| 1869 Feb. 3.      | R.   | Ghosha, Pratápachandra Bábu, B. A. <i>Calcutta.</i>                                                                    |
| 1870 May 4.       | R.   | Ghoshál, Satyánand Rájá. <i>Calcutta.</i>                                                                              |
| 1875 July 7.      | N.S. | Girdlestone, Charles Edward Ridgway, c. s. <i>Europe.</i>                                                              |
| 1861 Feb. 5.      | F.M. | Godwin-Austen, Lieut.-Colonel H. H., F. Z. S., F. R. G. S. <i>United Service Club, St. James', London.</i>             |
| 1862 July 2.      | N.R. | Gordon, Robert, c. E., Executive Engineer P. W. D., <i>Henzada, B. Burmah.</i>                                         |
| • 1869 July 7.    | N.R. | Gordon, James Davidson, c. s., c. s. I., Offg. Chief Commissioner. <i>Mysore.</i>                                      |
| 1875 July 7.      | N.S. | Gouldsbury, J. R. E. <i>Europe.</i>                                                                                    |
| 1863 Nov. 4.      | F.M. | Gowan, Major-General J. Y. <i>Woodlands, Wimbledon, London.</i>                                                        |
| 1877 Nov. 7.      | L.M. | Grant, Alexander, M. I. C. E., Director of State Railways, Western System. <i>Simla.</i>                               |
| 1866 June 6.      | N.S. | Gribble, Thomas William, c. s. <i>Europe.</i>                                                                          |
| • 1876 Nov. 15.   | N.R. | Grierson, George Abraham, c. s., Offg. Joint Magistrate. <i>Madhubani, Darbhanga, Tirhut.</i>                          |
| • 1861 Sept. 4.   | N.R. | Griffin, Lepel Henry, B. C. S., Depy. Commissioner and Offg. Secy. to the Govt. of Panjab. <i>Kapúr-thala, Panjab.</i> |

| Date of Election. |      |                                                                                                                                            |
|-------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1861 Feb. 6.      | N.R. | Growse, Frederick Salmon, M. A., C. S., Joint Magistrate. <i>Bulandshahr, N. W. P.</i>                                                     |
| Jan. 6.           | N.S. | Gunn, John Sutherland, M. B., Surgeon, 4th Bengal Cavalry. <i>Europe.</i>                                                                  |
| 1871 June 7.      | R.   | Habíburrahmán, Maulaví. <i>Calcutta.</i>                                                                                                   |
| 1867 July 3.      | N.R. | Hacket, Charles Augustus, Asst. Supdt. Geol. Survey of India. <i>Calcutta.</i>                                                             |
| 1861 Feb. 2.      | N.R. | Harrison, A. S., B. A., Principal, Muir Central College. <i>Allahabad.</i>                                                                 |
| 1877 Sept. 27.    | R.   | Hart, J., Attorney at Law. <i>Calcutta.</i>                                                                                                |
| 1859 Oct. 6.      | N.S. | Haughton, Col. John Colpoys, C. S. I. <i>Europe.</i>                                                                                       |
| 1874 Jan. 7.      | R.   | Heintze, C., Messrs. Ullmann, Hirschhorn and Co. <i>Calcutta.</i>                                                                          |
| 1875 March 3.     | N.R. | Hendley, Dr. Thomas Holbein, Residency Surgeon. <i>Jaipur, Rájputáná.</i>                                                                  |
| • 1875 Aug. 4.    | N.S. | Hewitt, James Francis Katherinus, C. S., Magistrate and Collector. <i>Europe.</i>                                                          |
| 1868 Aug. 5.      | N.R. | Hobart, Robert Thompson, C. S., Depy. Inspector General of Police. <i>Allahabad.</i>                                                       |
| 1872 Dec. 4.      | R.   | Hoernle, Rev. A. F. R., PH. D. Cathedral Mission College. <i>Calcutta.</i>                                                                 |
| 1868 Nov. 4.      | N.R. | Holroyd, Major William Rice Morland. Director of Public Instruction. <i>Lahore, Punjab.</i>                                                |
| 1873 Jan. 8.      | L.M. | Houstoun, G. L., F. G. S. <i>Johnstone Castle. Renfrewshire, Scotland.</i>                                                                 |
| 1863 Jan. 15.     | N.R. | Howell, Mortimer Sloper, C. S., Joint Magistrate. <i>Fatihpur.</i>                                                                         |
| 1866 Feb. 7.      | N.S. | Hoyle, G. W., Attorney at Law. <i>Not known.</i>                                                                                           |
| 1867 Aug. 7.      | N.R. | Hughes, T. H., A. B. S. M., F. G. S., Asst. Geol. Survey of India. <i>Europe.</i>                                                          |
| • 1866 Jan. 17.   | N.R. | Hughes, Captain W. G., M. S. C., Depy. Commissioner, Hill Tracts. <i>Arracan.</i>                                                          |
| • 1870 Jan. 5.    | N.R. | Hume, Allan Octavian, C. B., C. S., Secy. to the Govt. of India, Dept. of Revenue, Agriculture and Commerce. <i>Simla.</i>                 |
| • 1870 June 1.    | N.S. | Hunter, William Wilson, C. S., LL. D., Director General of Gazetteers to the Govt. of India. 6, <i>Grosvenor St., Edinburgh, Scotland.</i> |
| 1868 April 1.     | N.S. | Hyde, Col. Henry, R. E. <i>Europe.</i>                                                                                                     |
| • 1872 Dec. 4.    | N.R. | Ibbetson, Denzil Charles Jelf, C. S., Asst. Commissioner. <i>Karnál, Panjab.</i>                                                           |
| 1866 Mar. 7.      | N.R. | Irvine, William, C. S., Joint Magistrate. <i>Furruckabad.</i>                                                                              |
| 1871 Mar. 8.      | R.   | Isaac, T. S., C. E., Supdg. Engineer, P. W. D., Presidency Circle. <i>Calcutta.</i>                                                        |
| 1874 Feb. 4.      | N.R. | Jackson, Surgeon Major Charles Julian. <i>Muzaffarpur.</i>                                                                                 |
| 1876 July 5.      | R.   | Jarrad, Lieut. F. W., R. N., F. R. A. S., Depy. Superintendent, Marine Survey Dept. <i>Calcutta.</i>                                       |

| Date of Election. |      |                                                                                                                                  |
|-------------------|------|----------------------------------------------------------------------------------------------------------------------------------|
| 1866 Feb. 7.      | N.R. | Johnson, W. H. <i>Not known.</i>                                                                                                 |
| 1862 Mar. 5.      | N.R. | Johnstone, Major James William Hope, Depy. Commissioner. <i>Bannu, Panjab.</i>                                                   |
| 1867 Dec. 4.      | N.R. | Johnstone, Lieut.-Col. James, Political Agent. <i>Manipur, Assam.</i>                                                            |
| 1873 Dec. 3.      | N.R. | Johore, H. H., Maharaja of, K. C. S. I. <i>New Johore, Singapore.</i>                                                            |
| • 1873 April 2.   | N.R. | Jones, Frederick, C. S., Magistrate and Collector. <i>Tipperah.</i>                                                              |
| 1875 Nov. 3.      | N.R. | Jones, Samuel Simpson, B. A., C. S., Asst. Commissioner. <i>Hazareebagh.</i>                                                     |
| 1869 April 7.     | R.   | Kabiruddin Ahmad, Maulawí. <i>Calcutta.</i>                                                                                      |
| 1861 Dec. 4.      | N.R. | Kempson, M., M. A., Director of Public Instruction. N. W. P. <i>Allahabad.</i>                                                   |
| 1874 Dec. 2.      | N.R. | Khudábakhsh Khan, Maulawí. <i>Patna.</i>                                                                                         |
| 1867 Dec. 4.      | R.   | King, G., M. B., F. L. S., Supdt. Royal Botanical Gardens. <i>Sibpur, Calcutta.</i>                                              |
| 1867 Mar. 6.      | N.R. | King, Capt. H. W. <i>P. &amp; O. Co.'s Office, Calcutta.</i>                                                                     |
| 1862 Jan. 15.     | N.R. | King, W., Jr., A. B., F. G. S., Depy. Supdt. for Madras, Geol. Survey of India. <i>Geol. Surv. Office.</i>                       |
| 1875 Dec. 1.      | R.   | Knight, J. B., C. I. E. <i>Calcutta.</i>                                                                                         |
| 1877 Jan. 17.     | N.R. | Kishor, Kumara Radha Deb, Juvraj of Hill Tipperah. <i>Tipperah.</i>                                                              |
| 1860 May 5.       | R.   | Kurz, Sulpiz, Curator of the Herbarium, Royal Botanical Gardens. <i>Sibpur, Calcutta.</i>                                        |
| • 1877 Sept. 27.  | N.R. | LaTouche, James John Digges, B. A., C. S., Offg. Joint-Magistrate. <i>Muttra.</i>                                                |
| 1859 Dec. 7.      | N.S. | Leonard, Hugh, M. A., C. E. <i>Europe.</i>                                                                                       |
| 1870 July 6.      | R.   | Lethbridge, E. Roper, M. A., C. I. E. <i>Calcutta.</i>                                                                           |
| 1869 June 2.      | N.R. | Leupolt, John Cunningham, C. S., Joint Magistrate. <i>Etah.</i>                                                                  |
| • 1873 Feb. 5.    | R.   | Lewis, Timothy Richards, M. B., Special Asst. to Sanitary Commissioner with Govt. of India. <i>Calcutta.</i>                     |
| 1864 Nov. 2.      | R.   | Locke, H. H., Principal, School of Art. <i>Calcutta.</i>                                                                         |
| 1866 Jan. 17.     | N.R. | Low, James, Surveyor, G. T. Survey, <i>Thayetmyo, B. Burmah.</i>                                                                 |
| • 1869 July 7.    | R.   | Lyall, Charles James, B. A., C. S., Under Secretary Govt. of India, Dept. of Revenue, Agriculture and Commerce. <i>Calcutta.</i> |
| 1876 May 4.       | R.   | Lyall, John M., Messrs. Lyall, Rennie and Co. <i>Calcutta.</i>                                                                   |
| 1875 Jan. 6.      | R.   | Lydekker, Richard, Palæontologist, Geol. Survey of India. <i>Geological Survey Office, Calcutta.</i>                             |
| 1870 April 6.     | L.M. | Lyman, B. Smith. <i>Japan.</i>                                                                                                   |
| 1866 June 6.      | N.S. | Macdonald, Lieut.-Col. J., B. S. C., Depy. Superintendent of Surveys. <i>Europe.</i>                                             |

| Date of Election. |      |                                                                                                                |
|-------------------|------|----------------------------------------------------------------------------------------------------------------|
| • 1876 Dec. 6.    | N.R. | Macdonald, J. C., Supdt. Tarai District. <i>Nynce Tal.</i>                                                     |
| 1873 May 7.       | N.S. | Mackay, W., c. E. <i>Europe.</i>                                                                               |
| 1873 Dec. 3.      | R.   | McLeod, Surgeon-Major Kenneth, M. D., Secretary to the Surgeon-General, Indian Medical Dept. <i>Calcutta.</i>  |
| • 1848 April 5.   | L.M. | MacLagan, Major-General Robert, R.E., F.R.S.E., F.R.G.S., Secretary to the Govt. of the Panjab. <i>Lahore.</i> |
| 1867 July 3.      | N.S. | Macnamara, Dr. Charles. <i>Europe.</i>                                                                         |
| 1868 Dec. 2.      | N.R. | Macauliffe, Michael, B. A., c. s., Offg. Depy. Commissioner. <i>Montgomery, Panjab.</i>                        |
| 1874 Jan. 7.      | N.R. | Magrath, Charles Frederick, B. A., c. s., Joint Magistrate. <i>Monghyr.</i>                                    |
| 1877 June 6.      | N.R. | Maharájá of Dharbhanga. <i>Dharbhanga.</i>                                                                     |
| 1867 April 3.     | R.   | Mainwaring, Lieut.-Col. George Byres, s. c. <i>Calcutta.</i>                                                   |
| 1876 Dec. 6.      | N.S. | Malleson, Col. G. B., c. s. i. <i>Europe.</i>                                                                  |
| 1864 July 6.      | R.   | Mallik, Devendra, Bábu. <i>Calcutta.</i>                                                                       |
| 1869 Sept. 1.     | R.   | Mallik, Yadulál, Bábu. <i>Calcutta.</i>                                                                        |
| 1867 Mar. 6.      | R.   | Mallik, Yogendranáth, Bábu. <i>Andul.</i>                                                                      |
| 1872 Nov. 6.      | N.R. | Man, E. H., Asst. Supdt. <i>Port Blair, Andamans.</i>                                                          |
| • 1869 July 7.    | N.R. | Markham, Alexander Macaulay, c. s., Joint Magistrate. <i>Basti, N. W. P.</i>                                   |
| 1874 Aug. 5.      | F.M. | Marsh, Capt. Hipposley Cunliffe, s. c., 2nd in Command, 18th Bengal Cavalry. <i>Europe.</i>                    |
| 1873 July 2.      | N.R. | Marshall, C. W. <i>Berhampur.</i>                                                                              |
| 1873 Aug. 6.      | N.S. | Marshall, Lieut.-Col. William Elliot. <i>Europe.</i>                                                           |
| 1877 Feb. 7.      | N.R. | Marshall, Capt. Geo. Fred. Leycester, R. E., Eastern Jumna Canal Division, N. W. P. <i>Saharunpur.</i>         |
| 1876 Jan. 5.      | N.R. | McGregor, W., Supdt. Telegraphs, <i>Dhubri. Assam.</i>                                                         |
| 1860 Mar. 7.      | R.   | Medlicott, H. B., M. A., F. R. S., F. G. S., Supdt. Geological Survey of India. <i>Calcutta.</i>               |
| 1877 Mar. 7.      | R.   | Medlycott, Adolphus Edwin, Ph. D., The Rev. Vicar Catholic Church. 3, <i>Oullen Place, Howrah.</i>             |
| 1871 Sept. 6.     | N.R. | Miles, Lieut.-Colonel S. B., s. c., Political Agent. <i>Muskat.</i>                                            |
| 1870 July 6.      | R.   | Miller, A. B., B. A., Barrister at Law, Official Assignee. <i>Calcutta.</i>                                    |
| 1874 May 6.       | N.R. | Minchin, F. J. V. <i>Aska, Gunjam.</i>                                                                         |
| 1875 Aug. 4.      | N.S. | Minchin, Lieut.-Col. C. C., Political Agent and Supdt. Bahawalpur State. <i>Europe.</i>                        |
| 1856 Mar. 5.      | R.   | Mitra, Rájendralála, Bábu, Rái Bahádur, c. i. E., LL. D. <i>Calcutta.</i>                                      |
| 1876 Dec. 6.      | N.R. | Mockler, Capt. E., Political Agent. <i>Gwadur.</i>                                                             |
| 1874 July 1.      | N.R. | Molesworth, G. L., c. E., Consulting Engineer to Govt. of India for State Railways. <i>Simla.</i>              |
| 1854 Dec. 6.      | R.   | Morris, The Hon'ble George Gordon, B. c. s., Judge, High Court. <i>Calcutta.</i>                               |
| 1864 Nov. 2.      | R.   | Mukerjea, Bhudeva, Bábu, Inspector of Schools. <i>Chinsurah.</i>                                               |
| 1854 Oct. 11.     | N.S. | Muir, Sir William, K. c. s. i., B. c. s. <i>Europe.</i>                                                        |
| 1872 May 1.       | N.R. | Mukerjea, Niranján, Bábu. <i>Benares.</i>                                                                      |



| Date of Election. |      |                                                                                                                            |
|-------------------|------|----------------------------------------------------------------------------------------------------------------------------|
| 1867 Mar. 6.      | R.   | Mukerjea, Pearimohan, Bábu, M. A., Pleader, High Court. <i>Uttarpara.</i>                                                  |
| 1862 July 2.      | N.S. | Napier of Magdala, Baron, General, G. C. S. I., G. C. B. <i>Europe.</i>                                                    |
| 1876 May 4.       | R.   | Nash, A. M., M. A., Professor, Presidency College. <i>Calcutta.</i>                                                        |
| 1871 Jan. 4.      | N.S. | Newton, Isaac. <i>Europe.</i>                                                                                              |
| 1869 July 7.      | N.R. | Nursing Rao, A. V. <i>Vizagapatam.</i>                                                                                     |
| 1871 July 5.      | N.R. | Oates, E. W., C. E., Engineer. P. W. D., Garrison Div. Sittang Canal. <i>Rangoon, Pegu.</i>                                |
| • 1874 Oct. 4.    | R.   | O'Kinealy, The Hon'ble James, C. S., Offg. Secy. Govt. of India, Home Department. <i>Calcutta.</i>                         |
| 1851 June 4.      | N.S. | Oldham, Thomas, LL. D., F. R. S. <i>Eldon place, Rugby, England.</i>                                                       |
| 1873 Aug. 6.      | N.R. | Olpherts, W. J., C. E., Resident, Engr. E. I. Railway. <i>Benares.</i>                                                     |
| 1864 Mar. 2.      | R.   | Palmer, Surgeon-Major William John, Professor of Anatomy, Medical College. <i>Calcutta.</i>                                |
| 1873 Aug. 6.      | R.   | Parker, J. C., Custom House Agent, Custom House. <i>Calcutta.</i>                                                          |
| 1876 June 7.      | R.   | Parry, Robert, Professor, Presidency College. <i>Calcutta.</i>                                                             |
| 1862 May 7.       | L.M. | Partridge, Surgeon-Major Samuel Bowen, M. D. <i>Care of Messrs. Grindlay &amp; Co., No. 55, Parliament Street, London.</i> |
| 1871 Dec. 6.      | N.R. | Peal, S. E., Manager, Sapakati Tea Estate. <i>Sibságar, Assam.</i>                                                         |
| 1860 Feb. 1.      | N.S. | Pearse, Lieut.-Col. G. G. <i>Europe.</i>                                                                                   |
| 1868 Nov. 4.      | N.R. | Pearson, C. E., M. A., Inspector of Schools, Rawul Pindi, Circle. <i>Rawul Pindi.</i>                                      |
| 1873 Aug. 6.      | R.   | Pedler, Alexander, Professor of Chemistry, Presidency College. <i>Calcutta.</i>                                            |
| 1864 Mar. 2.      | R.   | Pellow, Fleetwood Hugo, C. S., Magistrate and Collector. <i>Hoogly.</i>                                                    |
| 1865 Sept. 6.     | N.R. | Peppe, T. E. <i>Ranchi.</i>                                                                                                |
| 1877 Aug. 1.      | N.R. | Peters, C. T., M. B., Belgaum. <i>Bombay Presidency.</i>                                                                   |
| 1868 May 6.       | N.R. | Peterson, F. W., Bombay Mint. <i>Bombay.</i>                                                                               |
| • 1835 July 1.    | F.M. | Phayre, Lieut.-G., Sir Arthur Purves, K. C. S. I., C. B. <i>Mauritius.</i>                                                 |
| 1864 Nov. 2.      | N.S. | Phear, Sir J. B. <i>Ceylon.</i>                                                                                            |
| 1869 Feb. 3.      | N.R. | Pickford, J., M. A. <i>Madras.</i>                                                                                         |
| 1875 Feb. 3.      | N.R. | Porter, W. J., Asst. Supdt. of Police. <i>Mergui.</i>                                                                      |
| 1872 Dec. 4.      | R.   | Prannáth Sarasvati, Pandit, M. A., B. L. <i>Bhowanipur.</i>                                                                |
| 1874 Dec. 2.      | N.R. | Protheroe, Capt. M., Deputy Supdt. <i>Port Blair.</i>                                                                      |
| • 1877 May 2.     | N.R. | Ravenshaw, Thomas Edw., C. S., Commissioner of Orissa Division. <i>Cuttack.</i>                                            |



| Date of Election. |       |                                                                                                         |
|-------------------|-------|---------------------------------------------------------------------------------------------------------|
| 1868 April 1.     | N.R.  | Rái, Pramathanáth Raja. <i>Digapati.</i>                                                                |
| 1876 July 5.      | R.    | Raye, D. O'Connell, M. D., 1st Resdt. Surgeon, Presidency General Hospital. <i>Calcutta.</i>            |
| 1877 Aug. 1.      | N.R.  | Rees, J. C., Asst. Engr. P. W. D., Thayetmo Division, <i>Prome. B. Burmah.</i>                          |
| • 1860 Mar. 7.    | N.R.  | Reid, Henry Stewart, C. S., Member, Board of Revenue, N. W. P. <i>Allahabad.</i>                        |
| • 1871 July 5.    | N.S.  | Reid, James Robert, C. S. <i>Europe.</i>                                                                |
| 1872 April 3.     | N.R.  | Richards, Dr. Vincent. <i>Goalundo.</i>                                                                 |
| 1860 Jan. 3.      | N.R.  | Rivett-Carnac, John Henry, C.I.E., C.S., Opium Agent. <i>Ghazipur.</i>                                  |
| 1868 April 1.     | R.    | Robb, Gordon. <i>Calcutta.</i>                                                                          |
| • 1863 April 1.   | N.R.  | Robertson, Charles, C. S., Secretary to the Govt. N. W. P. and Oude. <i>Allahabad.</i>                  |
| 1865 Feb. 1.      | R.    | Robinson, S. H. <i>Calcutta.</i>                                                                        |
| 1876 Dec. 6.      | N. S. | Rodon, Lieut. G. S., Royal Scots. <i>Europe.</i>                                                        |
| 1870 Jan. 5.      | N.R.  | Ross, Major Alexander George, Staff Corps, 2nd in Comd., 1st Sikh Infy. <i>Dera Ghazi Khan. Panjab.</i> |
| 1871 Dec. 6.      | F.M.  | Samuells, Major William Leycester, B. S. C. 24, <i>Coate's Garden, Edinburgh.</i>                       |
| 1877 May 2.       | N.R.  | Sandford, W., Supdt. Office of Director of State Railways, Western System. <i>Rawal Pindee, Panjab.</i> |
| 1872 Feb. 7.      | N.R.  | Sastri, Sashagiri M., B. A. <i>Madras.</i>                                                              |
| 1870 May 4.       | N.R.  | Schlich, Dr. W. <i>Darjiling.</i>                                                                       |
| 1869 Feb. 3.      | F.M.  | Schwendler, L. <i>Care of Messrs. Ernsthausen, Oesterley, 21, Minory Lane, London.</i>                  |
| 1876 July 5.      | N.S.  | Scott, Ross, C. S. <i>Europe.</i>                                                                       |
| 1874 July 1.      | N.R.  | Scully, Dr. John, Residency Surgeon, <i>Khatmandu.</i>                                                  |
| 1874 Dec. 2.      | N.R.  | Sen, Rám Dás, Bábu. <i>Berhampur.</i>                                                                   |
| 1876 Feb. 2.      | N.R.  | Shaw, R. B., Political Agent. <i>Mandalay.</i>                                                          |
| 1860 July 4.      | N.R.  | Shelverton, G. <i>Waltair, near Vizagapatam.</i>                                                        |
| 1863 April 1.     | N.R.  | Showers, Major-G. Charles Lionel. <i>Amballa.</i>                                                       |
| 1876 April 5.     | R.    | Sing, Kumara Kantichandra. <i>Calcutta.</i>                                                             |
| 1869 Feb. 3.      | N.R.  | Singh, Giriprasád, Thákur., Biswan Fort. <i>Allighar.</i>                                               |
| 1853 Dec. 7.      | N.R.  | Singh, Isvaríprasád, Bahádur, Rájá. <i>Benares.</i>                                                     |
| 1859 Aug. 3.      | R.    | Sinha, Balaichánd, Bábu. <i>Calcutta.</i>                                                               |
| 1877 Aug. 30.     | N.R.  | Singha, Pratápanaráyan, Deputy Magt. <i>Jehanabad.</i>                                                  |
| 1867 April 3.     | R.    | Sirkár, Mahendralál, Dr. <i>Calcutta.</i>                                                               |
| 1872 Aug. 7.      | N.R.  | Skrefsrud, Rev. L. O., India Home Mission to the Santhals. <i>Dúmka, Santhal Purgannahs.</i>            |
| • 1864 Sept. 7.   | N.R.  | Sladen, Lieut.-Col. E. B., M. S. C., Commissioner, Arracan Division. <i>Arracan.</i>                    |
| 1875 Feb. 3.      | N.S.  | Smidt, John. <i>Europe.</i>                                                                             |
| 1865 July 5.      | N.S.  | Smith, David Boyes, M. D. <i>Europe.</i>                                                                |
| • 1874 June 3.    | N.R.  | Smith, Vincent Arthur, C. S., Asst. Settlement Officer. <i>Hamirpur, N. W. P.</i>                       |
| 1864 Mar. 2.      | N.R.  | Spearman, Major Horace Ralph, Deputy Commissioner. <i>Bangoon, B. Burmah.</i>                           |

| Date of Election. |      |                                                                                                                                         |
|-------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------|
| 1877 April 4.     | N.R. | Spens, A. N. W., The Rev. Chaplain. <i>Sialkot.</i>                                                                                     |
| 1872 July 3.      | N.R. | Stephen, Carr, B. L., Judl. Asst. Commr. <i>Ludianah.</i>                                                                               |
| 1863 Sept. 2.     | N.R. | Stewart, R. D., <i>Raniganj.</i>                                                                                                        |
| 1875 July 7.      | N.S. | Stewart, M. G. <i>Europe.</i>                                                                                                           |
| 1876 Aug. 2.      | N.R. | St. John, Major Oliver Beauchamp, B. E., Principal, Mayo College. <i>Ajmir.</i>                                                         |
| • 1861 Sept. 4.   | R.   | Stokes, The Hon'ble Whitley, C. S. I., C.I.E. <i>Calcutta.</i>                                                                          |
| • 1869 Feb. 3.    | R.   | Strachey, The Hon'ble Sir J., K.C.S.I., C.I.E. <i>Calcutta.</i>                                                                         |
| 1859 Mar. 2.      | N.R. | Stubbs, Lieut.-Col. Francis William, Royal Artillery. <i>Lucknow.</i>                                                                   |
| • 1858 July 7.    | N.R. | Sutherland, Henry Cobbe, M. A., B. C. S., Dist. and Sess. Judge. <i>Backergunge.</i>                                                    |
| 1864 Aug. 11.     | R.   | Swinhoe, W., Attorney-at-Law. <i>Calcutta.</i>                                                                                          |
| 1871 Mar. 1.      | R.   | Tagore, Dvijendranath, Bábu. <i>Calcutta.</i>                                                                                           |
| 1871 Jan. 4.      | R.   | Tagore, Gunendranath, Bábu. <i>Calcutta.</i>                                                                                            |
| 1868 June 3.      | R.   | Tagore, Jotendro Mohun, The Hon'ble Maharaja. <i>Calcutta.</i>                                                                          |
| 1865 Sept. 6.     | R.   | Tawney, C. H., M. A., Principal, Presidency College. <i>Calcutta.</i>                                                                   |
| 1865 April 5.     |      |                                                                                                                                         |
| 1874 Mar. 4.      | N.S. | Taylor, R., C. S. <i>Europe.</i>                                                                                                        |
|                   | R.   | Taylor, Commander A. D., late Indian Navy. <i>Calcutta.</i>                                                                             |
| • 1860 May 2.     | N.R. | Temple, The Hon. Sir R. Bart. K. C. S. I., C.I.E. B. C. S. <i>Bombay.</i>                                                               |
| 1876 Feb. 2.      | R.   | Tennant, Col. James Francis, B. E., F. R. S. <i>Calcutta.</i>                                                                           |
| 1875 June 2.      | N.R. | Thibaut, Dr. G., Prof. Sanskrit College. <i>Benares.</i>                                                                                |
| 1869 Oct. 6.      | N.R. | Thomson, A., Inspector of Schools. <i>Faizabad.</i>                                                                                     |
| • 1875 Nov. 3.    | N.R. | Thomson, Robert George, C. S., Asst. Commr. <i>Karnal, Panjab.</i>                                                                      |
| 1847 June 2.      | R.   | Thuillier, Major-G., Henry Edward Landor, B. A., C. S. I., F. R. S. <i>Care of Messrs. Grindlay and Co., 55, Parliament St. London.</i> |
| 1865 July 5.      | N.S. | Tolbort, Thos. Wm. Hooper, C. S. <i>Europe.</i>                                                                                         |
| 1871 April 5.     | F.M. | Treffitz, Oscar. <i>Care of Messrs. E. D. Keilhorn and Co., 16, St. Mary Axe, London.</i>                                               |
| • 1861 June 5.    | L.M. | Tremlett, James Dyer, M. A., C. S., Depy. Commr. <i>Kangra.</i>                                                                         |
| 1872 July 3.      | N.R. | Trevor, William Spottiswoode, Lieut.-Col., B. E., Offg. Chief Engr. and Secy. to the Chief Commr., B. Burmah. <i>Rangoon.</i>           |
| 1873 April 6.     | R.   | Turnbull, Robert, Secretary to the Corporation. <i>Calcutta.</i>                                                                        |
| 1863 May 6.       | N.R. | Tyler, J. W., M. D. <i>Agra.</i>                                                                                                        |
| 1864 Feb. 3.      | N.R. | Verchère, A. M., M. D. <i>Agra.</i>                                                                                                     |
| 1864 April 6.     | N.R. | Vijayarāma Gujapati Raj Munniā Sultan Bahádur, Mahārājah Mirza Vijayanagram. <i>Benares.</i>                                            |
| 1871 Feb. 1.      | N.S. | Waagen, Dr. W., Geological Survey. <i>Europe.</i>                                                                                       |
| 1869 Aug. 4.      | R.   | Wáhid Ali, Prince Jahán Qadr Muhammad, Bahádur. <i>Garden Reach.</i>                                                                    |

| Date of Election. |      |                                                                                                              |
|-------------------|------|--------------------------------------------------------------------------------------------------------------|
| 1865 Nov. 1.      | R.   | Waldie, David, F. G. s. <i>Calcutta.</i>                                                                     |
| 1861 May 1.       | R.   | Walker, Col. James T., C. B., R. E., F. R. s. <i>Calcutta.</i>                                               |
| 1875 April 7.     | R.   | Wall, Dr. Alfred John, B. Medical Service. <i>Calcutta.</i>                                                  |
| 1863 Oct. 7.      | R.   | Waller, Walter Kerr, M. B. <i>Calcutta.</i>                                                                  |
| 1865 May 3.       | R.   | Waterhouse, Capt. James, B. s. c., Asst. Surveyor General. <i>Calcutta.</i>                                  |
| 1874 July 1.      | R.   | Watt, Dr. George, Professor, Hughli College. <i>Chinsurah.</i>                                               |
| 1876 Dec. 6.      | N.R. | Webb, W. T., M. A., Prof. Dacca College. <i>Dacca.</i>                                                       |
| •1869 Sept. 1.    | R.   | Westland, James, c. s. <i>Calcutta.</i>                                                                      |
| 1867 Feb. 6.      | N.S. | Westmacott, Edward Vesey, B. A., C. s. <i>Europe.</i>                                                        |
| 1862 Oct. 8.      | R.   | Wheeler, James Talboys. <i>Calcutta.</i>                                                                     |
| •1873 April 2.    | N.R. | White, Edmond, c. s., Offg. Joint Magistrate and Collector. <i>Allahabad.</i>                                |
| •1875 Feb. 3.     | N.R. | Whiteway, Richard Stephen, c. s., Asst. Settlement Officer. <i>Muttra.</i>                                   |
| 1877 April 4.     | N.R. | Whitty, Irvine John, Supdt., Khurhurbari Collieries. <i>Giridhi, E. I. Railway.</i>                          |
| 1867 Aug. 7.      | N.R. | Wilcox, F., Dist. Supdt. of Police. <i>Purulia, Manbhum.</i>                                                 |
| •1873 May 7.      | N.R. | Williams, George Robert Carlisle, B. A., C. s., Offg. Joint Mag. and Collr. in charge of Ballia.             |
| 1867 Jan. 16.     | N.R. | Williamson, Capt. William John, Offg. Inspr. Genl. of Police and Supdt. of Stamps. <i>Garó Hills, Assam.</i> |
| 1876 April 5.     | R.   | Wilson, Alexander. <i>Calcutta.</i>                                                                          |
| •1870 Aug. 3.     | N.R. | Wilson, Robert Henry, B. A., C. s., Mag. and Collr. <i>Midnapore.</i>                                        |
| 1866 Mar. 7.      | L.M. | Wise, Dr. J. F. N. <i>Rostellan, County Cork. Ireland.</i>                                                   |
| •1867 July 3.     | N.R. | Wood, Dr. Julius John, Supdt. of Vaccination. <i>Ráncbi.</i>                                                 |
| 1874 Mar. 4.      | N.S. | Wood, C. H. <i>Europe.</i>                                                                                   |
| 1870 Jan. 5.      | F.M. | Wood-Mason, James. <i>Care of Messrs. King and Co., 65, Cornhill. London.</i>                                |
| 1873 Aug. 6.      | N.R. | Woodthorpe, Lieut. Robert Gosset, R. E., Asst. Supdt., Khási and Gáro Hills Survey. <i>Shillong.</i>         |

## HONORARY MEMBERS.

|            |     |                                          |                         |
|------------|-----|------------------------------------------|-------------------------|
| 1825 Mar.  | 9   | M. Garcin de Tassy, Memb. de l'Institut. | <i>Paris.</i>           |
| 1821 „     | 6.  | Sir John Phillippart.                    | <i>London.</i>          |
| 1826 July  | 1.  | Count de Noe.                            | <i>Paris.</i>           |
| 1835 May   | 6.  | Professor Isaac Lea.                     | <i>Philadelphia.</i>    |
| 1847 Sept. | 1.  | Col. W. Munro.                           | <i>London.</i>          |
| 1847 Nov.  | 3.  | His Highness the Nawab Nazim of Bengal.  | <i>Murshidabad.</i>     |
| 1848 Feb.  | 2.  | Dr. J. D. Hooker, B. N., F. R. S.        | <i>Kew.</i>             |
| 1848 Mar.  | 8.  | Professor Henry.                         | <i>Princeton, U. S.</i> |
| 1853 April | 6.  | Major-Gen. Sir H. C. Rawlinson, K. C. B. | <i>London.</i>          |
| 1858 July  | 6.  | B. H. Hodgson.                           | <i>Europe.</i>          |
| 1859 Mar.  | 2.  | The Hon'ble Sir J. W. Colville, Kt.      | <i>Europe.</i>          |
| 1860 „     | 7.  | Professor Max Müller.                    | <i>Oxford.</i>          |
| 1860 Nov.  | 7.  | Monsieur Stanislas Julien.               | <i>Paris.</i>           |
| 1860 „     | 7.  | Edward Thomas.                           | <i>London.</i>          |
| 1860 „     | 7.  | Dr. Aloys Sprenger.                      | <i>Bern.</i>            |
| 1860 „     | 7.  | Dr. Albrecht Weber.                      | <i>Berlin.</i>          |
| 1868 Feb.  | 5.  | General A. Cunningham, C. S. I.          | <i>India.</i>           |
| 1868 „     | 5.  | Professor Bápu Déva Sástri.              | <i>Benares.</i>         |
| 1868 „     | 5.  | Dr. T. Thomson.                          | <i>London.</i>          |
| 1868 „     | 2.  | A. Grote.                                | <i>London.</i>          |
| 1871 „     | 7.  | Charles Darwin.                          | <i>London.</i>          |
| 1872 „     | 1.  | Sir G. B. Airy.                          | <i>London.</i>          |
| 1872 June  | 5.  | Professor T. H. Huxley.                  | <i>London.</i>          |
| 1875 Nov.  | 3.  | Dr. O. Böhtlingk.                        | <i>Jena.</i>            |
| 1875 „     | 3.  | Professor J. O. Westwood.                | <i>Oxford.</i>          |
| 1876 April | 5.  | Yule, Col. H., R. E., C. B.              | <i>London.</i>          |
| 1876 „     | 5.  | Siemens, Dr. Werner.                     | <i>Berlin.</i>          |
| 1877 Jan.  | 17. | Dr. John Muir.                           | <i>Edinburgh.</i>       |

## CORRESPONDING MEMBERS.

|           |    |                              |                     |
|-----------|----|------------------------------|---------------------|
| 1844 Oct. | 2. | Macgowan, Dr. J.             | <i>Europe.</i>      |
| 1856 June | 4. | Krämer, Herr A. von.         | <i>Alexandria.</i>  |
| 1856 „    | 3. | Porter, Rev. J.              | <i>Damascus.</i>    |
| 1856 „    | 4. | Schlagintweit, Herr H. von.  | <i>Munich.</i>      |
| 1856 „    | 4. | Smith, Dr. E.                | <i>Beyrout.</i>     |
| 1859 „    | 4. | Tailor, J., Esq.             | <i>Bussorah.</i>    |
| 1857 Mar. | 4. | Nietner, J., Esq.            | <i>Ceylon.</i>      |
| 1858 „    | 3. | Schlagintweit, Herr R. von.  | <i>Giessen.</i>     |
| 1859 Nov. | 2. | Frederick, Dr. H.            | <i>Batavia.</i>     |
| 1859 May  | 4. | Bleeker, Dr. H.              | <i>Europe.</i>      |
| 1860 Feb. | 1. | Baker, The Rev. H.           | <i>E. Malabar.</i>  |
| 1861 July | 3. | Gösche, Dr. R.               |                     |
| 1862 Mar. | 5. | Murray, A., Esq.             | <i>London.</i>      |
| 1863 July | 4. | Barnes, R. H., Esq.          | <i>Ceylon.</i>      |
| 1866 May  | 7. | Schlagintweit, Prof. E. von. | <i>Munich.</i>      |
| 1866 „    | 7. | Sherring, Rev. M. A.         | <i>Benares.</i>     |
| 1868 „    | 5. | Holmböe, Prof.               | <i>Christiania.</i> |

# ASSOCIATE MEMBERS.

|            |    |                                               |
|------------|----|-----------------------------------------------|
| 1865 May   | 3. | Dall, Rev. C. H. <i>Calcutta.</i>             |
| 1874 Feb.  | 4. | Schaumburgh, J., Esq. <i>Calcutta.</i>        |
| 1874 April | 1. | Lafont, Rev. F. E., s. J. <i>Calcutta.</i>    |
| 1875 Dec.  | 1. | Bate, Rev. J. D. <i>Allahabad.</i>            |
| 1875 „     | 1. | Maulawí Abdul Hai, Madrasah. <i>Calcutta.</i> |

## LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.\*

\**Rule 40.*—After the lapse of 3 years from the date of a Member leaving India, if no intimation of his wishes shall in the interval have been received by the Society, his name shall be removed from the list of Members.

The following Members will be removed from the next Member List of the Society under the operation of the above Rule.

|                        |       |
|------------------------|-------|
| Lt.-Col. A. S. Allan,  | 1874. |
| G. W. W. Barclay,      | 1875. |
| Sir G. Campbell,       | 1874. |
| Sir W. Elliott,        |       |
| Sir J. Fayrer,         | 1873. |
| Sir T. D. Forsyth,     | 1875. |
| Col. J. C. Haughton,   | 1874. |
| H. Leonard,            | 1874. |
| Dr. C. Macnamara,      | 1874. |
| Lt.-Col. G. G. Pearse, | 1873. |
| Dr. W. Waagen,         | 1875. |

## LOSS OF MEMBERS DURING 1876.

### BY RETIREMENT.

Babu Bhagabaticharan Mallik. *Calcutta.*  
W. D. Bruce, Esq. *Calcutta.*  
T. E. Coxhead, Esq. *Tiperah.*  
The Rev. C. H. Chard. *Thayetmyo, B. Burmah.*  
F. C. Daukes, Esq. *Calcutta.*  
Capt. T. Deane. *Calcutta.*  
Col. H. Drummond. *Calcutta.*  
C. B. P. Gordon. *Calcutta.*  
A. J. Hughes, Esq. *Barrackpur.*  
Major Lord R. Kerr. *Calcutta.*  
Dr. J. F. McConnell. *Calcutta.*

Manickjee Rustomjee, Esq. *Calcutta.*  
 G. Nevill, Esq. *Calcutta.*  
 S. Pell, Esq. *Calcutta.*  
 F. Schlegel, Esq. *Calcutta.*  
 D. Scott, Esq. *Cuttack.*  
 Lt.-Col. A. D. Vanrenen. *Calcutta.*

---

BY DEATH.

*Ordinary Members.*

J. Geoghegan, Esq. *Europe.*  
 Raja Grishchandra Sing. *Calcutta.*  
 The Hon'ble Maharaja Ramanatha Tagore. *Calcutta.*  
 Col. D. G. Robinson. *Bombay.*  
 Babu Vrindabanchandra Mandala. *Balasor.*

*Corresponding Member.*

Swinhoe, R. *China.*

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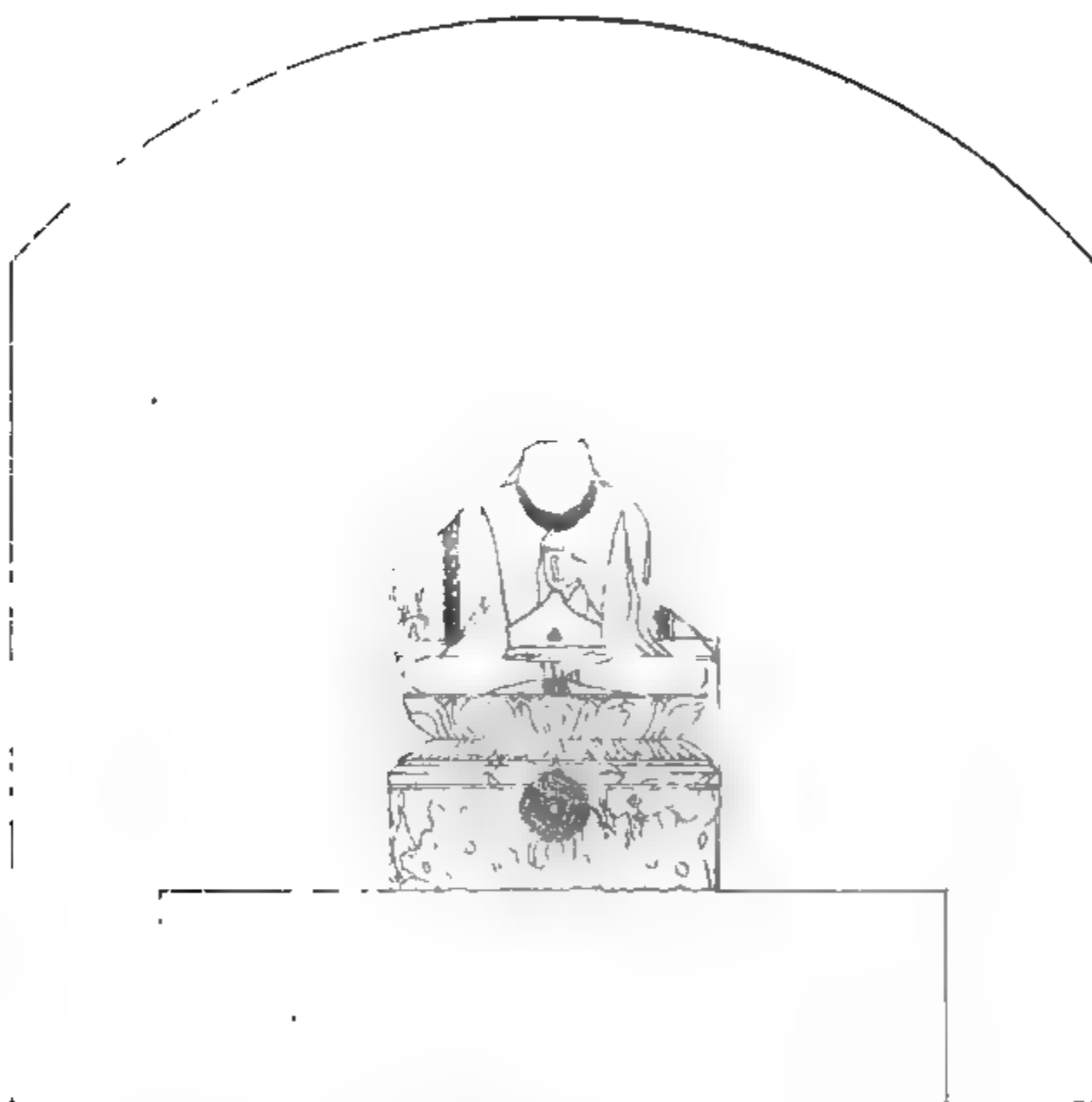


FIGURE OF BUDDHA FOUND AT SARNATH

Scale  $\frac{1}{2}$  Inch = 1 Foot



Engraved at the Surveyor General's Office Calcutta





PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL.

EDITED BY  
THE HONORARY SECRETARIES.



JANUARY TO DECEMBER,  
1879.



CALCUTTA :  
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1879.



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## ERRATA.



Plate VI should be Plate V

|   |      |   |   |      |
|---|------|---|---|------|
| ” | VII  | ” | ” | VI   |
| ” | VIII | ” | ” | VII  |
| ” | IX   | ” | ” | VIII |
| ” | X    | ” | ” | IX   |
| ” | XI   | ” | ” | X    |
| ” | XII  | ” | ” | XI   |



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JANUARY, 1879.

---

The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 8th instant, at 9 P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed:—

The following gentlemen, duly proposed and seconded at the last Meeting, were ballotted for and elected Ordinary Members—

R. Sewell, Esq., M. C. S.

J. F. Browne, Esq., C. E., M. R. A. S.

Capt. W. E. Gowan.

The following are candidates for ballot at the next meeting—

1. Lieut. C. R. Macgregor, Quarter Master, 44th N. I., Shillong, proposed by Dr. Anderson, seconded by G. H. Damant, Esq., C. S.

2. Major J. Sconce, B. S. C., Depy. Surveyor General of India, proposed by Col. J. T. Walker, R. E., C. B., seconded by Capt. J. Waterhouse.

3. J. F. Duthie, Esq., Superintendent Botanical Gardens, Saharunpore, proposed by Dr. G. King, seconded by Capt. J. Waterhouse.

The SECRETARY announced that Dr. W. J. Palmer had intimated his desire to withdraw from the Society on proceeding to England.

In the absence of Dr. Hoernle, Philological Secretary, Mr. C. H. TAWNEY read the following note on Jainism received from Mr. E. Thomas:

*Jainism.*

Among other questions put down for consideration and discussion at the 'Congrès des Orientalistes' at Lyons, on the 31st of August last, there was formulated a subdivision devoted to "Les Djâïnas sont-ils d'anciens Bouddhistes antérieurs à Sakia Mouni, ou des Bouddhistes modifiés depuis les persécutions brahmaniques?"

As I have paid some attention to this subject,\* though unable to attend the Congress, and therefore unaware of the course taken in the dis-

\* 'Jainism; or, the Early Faith of Asoka' (Trübner, 1877); J. R. A. S., IX, p. 166.

cussion, you will, perhaps, allow me to advert in your columns to a very important item, bearing upon the relative priority of the creeds of Jainism and Buddhism which has not hitherto been noticed ; that is to say, how their reputed dates balance and adjust themselves *inter se* within the bounds of reasonable probability.

The Jains have a fixed and definite date for the *Nirvána* of “Mahāvīra,” their great saint, which is established by the concurrent testimony of their two sects, whose method of reckoning varies in itself, thereby securing, as it were, a double entry. The Svetambaras date in the era of Vikramāditya, 57 B. C. ; the Digambaras reckon by the Saka *samvat*, 78 A. D., and both arrive at the same figures of B. C. 526-7 for the death of Mahāvīra. This calculation is equally supported by the dynastic lists, which satisfactorily fill in *the* period from the accession of “Pálaka, the lord of Avanti, [who] was anointed in that night in which.....Mahāvīra entered Nirvána,” “to the four years of Saka,” who immediately preceded Vikramāditya.\*

On the other hand, Buddha’s date varies according to different authorities from the extreme points of B. C. 2420 to 453, and even is reduced so low as 370 B. C. ; so that up to this time modern inquirers have been unable to concur in the determination of this epoch† further than to suspect, as we are taught by the Chinese, that the period was antedated from time to time, with the direct purpose of arrogating priority over other saints.

Now, if the ascertained Jain date will serve to determine the era of Buddha, under the theory that Buddha *himself* was a disciple of Mahāvīra, it will, in the fact, go far to establish the priority of the latter, and the pre-existence of the creed of which he was the twenty-fourth or last prophet.

The date of Buddha most largely accepted has been adopted from the Ceylon annals, which supply the figures 543 B. C.‡ But, as was remarked by Mr. Turnour, who first investigated the local traditions, the acceptance of such a date involved an error, in default of the required period of sixty years (sixty-six) ; or, to use his own words, “the discrepancy can only proceed from one of these two sources ; viz., either it is an intentional perversion, adopted to answer some national or religious object, which is not readily discoverable ; or Chandra Gupta is not identical with Sandra-

\* Dr. Bühler, ‘Indian Antiquary,’ Vol. II, 363 ; J. R. A. S., IX, 15, note 2.

† Prof. Wilson, J. R. A. S., XVI, 247 ; see also IX, n. s. 170 ; Beal, ‘Travels of Fah-Hian,’ pp. xxvi. 22 ; and Hioun-Thsang (Paris, 1857), I, p. 163.

‡ Lassen ; St. Hilaire ; M. Barth, *Revue Critique*, 13th June, 1874 ; Prof. Weber, ‘History of Indian Literature’ (London, Trübner, 1878), p. 287 ; Childers, *Páli Dictionary*. I myself am only a recent convert, J. R. A. S., I. 463.

cottus.”\* A partial reconciliation of the error was proposed by the method of restoring to the dynasty of the Nandas the full hundred years assigned to them by some Paurānik authorities, in lieu of the forty-four allowed for in the Ceylon lists; but if the local annals were so dependent for their accuracy upon extra-national corrections, their intrinsic merits could have stood but little above zero; and any such summary introduction of sixty-six years from outside sources could scarcely have been held to be satisfactory, unless the *assumed* total of 543 years B. C. were proved to be a *fixed quantity* by better external testimony than has hitherto been adduced.

To General Cunningham belongs the merit of having first proposed, in 1854, the fixing of Buddha's *Nirvána* in “477 B. C.”†—a result which he obtained from original figure calculations; while Max Müller, in 1859, independently arrived at the same conclusion, from a more extended critical review of the extant literary evidence.‡

General Cunningham has lately enlarged the sphere of his observations, and in adopting Colebrooke's view in regard to the fact that Gautama Buddha was “the disciple of Mahāvīra,” has materially fortified his early arguments—in re-asserting that the *Nirvána* of Buddha must be placed in “478 B. C.,” or “forty-nine years”§ after the *release* of Mahāvīra, the last of the Jinās.

The passages relied upon by Colebrooke in 1826|| have since been confirmed by important contributions from other sources. None, however, bring the question home so distinctly and in so quaintly graphic a way as Prof. Weber's translation of a passage from the ‘Bhagavatī,’¶ wherein the *Chela*, “the holy Mahāvīra's eldest pupil, Indrabhūti”—“houseless of Gautama's Gotra,”—begins to distrust the negative perfection of Jainism, in the terms of the text,—“Thereupon that holy Gautama, in whom faith, doubt, and curiosity arose, grew and increased, rose up. Having arisen, he went to the place where the sacred Āramana Mahāvīra was.....After performing these [salutations] he praises him and bows to him. After so doing, not too close, not too distant, listening to him, bowing to him, with his face towards him, humbly waiting on him with folded hands, he thus spoke.....”

In conclusion, I may recapitulate certain deductions, which I have suggested elsewhere. The juxtaposition of the last representative of the

\* The Mahāwanso, Ceylon, 1837, pp. xlviii, l.-lii, &c.

† Journal Asiatic Society of Bengal, 1854, p. 704.

‡ ‘Ancient Sanskrit Literature,’ London, 1859, p. 298.

§ ‘Corpus Inscriptionum Indicarum,’ Calcutta, 1877, p. v.

|| Prof. Cowell's edition of Colebrooke's ‘Essays,’ II, 278; Transactions Royal Asiatic Society, I, 520.

¶ ‘Fragment der Bhagavatī,’ Berlin, 1867.

one faith with the first exponent of the other, which took over so many traditions that it retained in common with the parent creed, is a point of marked importance. Eclipsed for a time by the energy of the reformers, whose missionaries carried the Buddhist doctrines over so large a section of the globe, non-proselytizing Jainism has survived in its simplicity—as the natural outcome of the ideas and aspirations of a primitive race—still undisturbed in the land of their common birth; while Buddhism, with its fantastic elaborations, retains scant honour, and no place within the limits of its *nidus* in India proper. (*Athenæum*.)

Mr. W. T. BLANFORD exhibited the skin and skull of a bear from the neighbourhood of Gwádar, and read the following—

*Note on the 'Mamh' or Baluchistan Bear, Ursus gedrosianus.*

In November 1877, I exhibited to the Society a skin of the bear inhabiting Baluchistan.\* In the belief that this skin, which was of a brown colour, indicated the existence of an animal previously undescribed, I proposed to call the species *Ursus gedrosianus*. From various sources, however, both before and after the publication of the paper, I had heard that a black bear occurs in Baluchistan, and it remained to be seen whether there were two species, or whether the colour was variable. Moreover as no skull had been examined, the affinities of the animal remained doubtful.

I am indebted to my friend Major Mockler, who sent me the first specimen, for enabling me to clear up this difficulty. He has succeeded in procuring from the neighbourhood of Gwádar a second skin, in better condition than the first, and with the skull. The fur of the skin now sent, although far from being as black as in Himalayan specimens of *Ursus torquatus*, is very much darker than in the example previously received; the hairs are rather coarse, but there is no marked distinction from those of the Himalayan black bear. The Baluchistan skull is scarcely distinguishable from one in the Indian Museum, belonging to a female *U. torquatus*, recently living in the Zoological Gardens at Alipore.† The following are the dimensions of the skull from Gwádar.

|                                                           | inches | millem. |
|-----------------------------------------------------------|--------|---------|
| Length from the lower margin of the <i>foramen magnum</i> |        |         |
| to end of premaxillaries, .....                           | 9·7    | 246     |
| Ditto from occiput to do.....                             | 10·45  | 265     |
| Breadth across zygomatic arches,.....                     | 6·9    | 175     |
| Least breadth of cranium between orbits, .....            | 2·9    | 73      |

\* P. A. S. B., 1877, p. 204; J. A. S. B., XLVI, Pt. 2, p. 317.

† I am indebted to Dr. Anderson for calling my attention to this specimen.



|                                                                                                                  |      |     |
|------------------------------------------------------------------------------------------------------------------|------|-----|
| Width of muzzle behind canine teeth,.....                                                                        | 2·6  | 64  |
| Length of bony palate from the opening of the posterior nares to the anterior border of the premaxillaries,..... | 5·52 | 140 |
| Length of the lower jaw from angle to symphysis, ...                                                             | 7·55 | 192 |
| Height of ditto,.....                                                                                            | 4·3  | 110 |

I should have been disposed to consider the Baluchistán bear identical with *U. torquatus* (*U. thibetanus*) but for the arrival of another skull of the former at the Indian Museum. This, although fully adult, is so much smaller than any full grown skull of the Himalayan black bear, as to render it possible that the first skull, although precisely corresponding in size to that of a female *U. torquatus*, belonged to a male *U. gedrosianus*. The latter can, however, be but little more than a race or sub-species of the former, and is evidently a near ally.

The distribution of the Himalayan black bear, if the Baluchistán form be classed as a sub-species, is very anomalous and remarkable. It is essentially a forest animal inhabiting the slopes of the Himalayas and parts of Southern China, and, it is said, even Eastern Siberia, whilst a closely allied species is found in Japan. But the extension of this Himalayan form to the mountains of Baluchistan has no known parallel amongst other animals. The fauna of Baluchistan is desert with an admixture of Indian types, but the Indian types are those of the Indian Peninsula and not of the Himalaya. The most characteristic Indian forms in Baluchistan\* are such animals as *Sciurus palmarum*, *Gerbillus indicus*, *Athene brahma*, *Gymnoris flavicollis*, *Ortygornis ponticeriana*, &c., but nearly all are Peninsular types in India, prevalent in the drier parts of the Peninsula, and as a rule wanting both in the Himalayas and to the eastward of the Bay of Bengal. The only known Baluchistan species that range to the east of the Bay of Bengal are two birds, *Pratincola caprata* and *Butastur teesa*, and a lizard, *Calotes versicolor*. But all these abound in the plains of India, and no example has hitherto been known of an animal wanting in the Indian peninsula, but occurring in the Himalayas and also in the hills of Baluchistan. The very great difference in physical conditions between the damp forest-clad slopes of the Himalayas and the bare ranges of the Baluchistan highlands renders it very surprising that the same or closely allied types of bear should be found in both areas.

The PHILOLOGICAL SECRETARY read the following extracts from a letter from Bábu Hariśchandra to Dr. Rájendralála Mitra on a new Hindi book—*Drista-kúṭa of Súr Dás*, with his own commentary.

\* Eastern Persia, Vol. II, p. 16.

“Two or three days ago I found quite a new Hindi book : *Dristakúta* of *Súr Dás* with his own commentary. The book contains at the end a sketch of the author's biography, which differs from the story of his life hitherto known. The *Vártá* of 84 Vaishnavas also contains some biography of *Súr Dásjī*. It mentions that he was a *Sárasvata Bráhma*n, and was the son of poor parents, and had no brothers. His village was *Síhí* near Delhi. This is the idea we Vaishnavas believe. But the poetry at the end of this new book says—He was born in *Práth Jagat Gotra*. The founder of his family was *Brahma Ráo*. In the family of *Brahma Ráo*, there was a man *Bhonchand* or *Chand* in the time of *Prithviráj*. The king *Prithviráj* gave him *Joálá Désa*. He had four sons. First *Nareśa*, second *Guṇachand*, third and fourth not told. *Sílachand* was *Guṇachand*'s son. From him *Bírchand*. In his family *Hariśchand* was most famous. He lived first in *Agra*, and then in *Gopáchal*, where he got a son, name not told (or if the word *Bir* is a proper name, it must be *Bírchandra*). He had seven sons : *Krishnachand*, *Udánchand*, *Rúpchand*, *Buddhichand*, *Devachand*, *Prabodhachand*, and *Surajchand*. If the word *Rúpchand* be taken as an adjective, the name of the fourth son would be *Prakáschand*. All these were slain in the *Muhammadan* battles, except one, *Surajchand*, who was blind. (It seems that then his family had fallen into a low state.) *Surajchand*, walking out, once fell into a well, whence he was saved by *Srí Krishna*. No one helping him he was for seven days in that blind well, but *Srí Krishna* himself saved his life, and showed him his own beauty—full *svarúpa*. He named him *Súr*, *Súr Dás* and *Súrasyám*. Then he went to *Vraj*, where *Go-sainji* (son of *Srí Vallabháchárya*) made him one of अष्टदास Vaishnavas.

The *Bhaktamál* says that *Súr Dás* was a *Bráhma*n, no doubt, but he was living at *Gaughát*, a place near *Agra*, and so all other Vaishnava *gran-thas* say. He was a great poet, as told

“सूर सूर तुलसी ससी उडुगन केशवदास ।  
 अब के कवि खद्योत सम जहं तहं करहिं प्रकास ॥  
 जो कुछ कही सो अंधरै कही कबिरा कही अनूठी ।  
 बाकी बची सो तुलसी कही अब कहै सो भूठी or जूठी ॥”

It is said that the famous poet *Behári* once, when walking about, saw a man very uneasy. Then he asked him—

किधैं सूर कर सर लग्यौ किधैं सूर की पीर ।  
 किधैं सूर को पद सुन्यो जो अस विकल सरीर ॥  
 प्रथम ही प्रथ जगाते में प्रगट अद्भुत रूप ।  
 ब्रह्म एव विचारि बृन्हा धरौ नाम अनूप ॥

पान पय देवी दियो सिव आदि सुर सुख पाय ।  
 कछौ दुर्गा पुत्र तेरो भयो अति अधिकाय ॥  
 तासु बंस प्रसंस में भौ चन्द चार नवीन ।  
 पारि पायन सुरन के पितु सहित अस्तुति कीन ॥  
 भूप पृथ्वीराज दीन्हो तिन्है ज्वाला देस ।  
 तनय ताके चार कीन्हो प्रथम आप नरेस ॥  
 दूसरे गुनचन्द ता सुत सीलचन्द सरूप ।  
 बीरचन्द प्रताप पूरन भयो अद्भुत रूप ॥  
 रंतभार हमीर भूपति संग खेलत आय ।  
 तासु बंस अनूप भौ हरिचन्द अति बिल्लाय ॥  
 आगरे रहि गोपचल में भयो ता सुत वीर ।  
 पुत्र जन्मे सात ताके महाभट गम्भीर ॥  
 ह्यणचन्द आरचन्द जु रूपचन्द सुभाइ ।  
 बुद्धिचन्द प्रकास चौथो चन्द भौ सुखदाइ ॥  
 देवचन्द प्रबोध मंदित चन्द ताको नाम ।  
 भयो सप्तो नाम सूरजचन्द मन्द निकाम ॥  
 सो समर करि स्याहि सेवक गए बिधि के लोक ।  
 रहो सूरज चन्द दग तें हीन भरवर सोक ॥  
 परो कूप पुकार काळ सुनी ना संसार ।  
 सातए दिन आय जदुपति कीन आप उधार ॥  
 दियो चख दै कही सिंसु सुनु मांग वर जो चार ।  
 हैं कछौ प्रभु भगति चाहत सनु नास उपाइ ॥  
 दूसरो ना रूप देखै देखि राधा स्याम ।  
 सुनत करना सिन्धु भाखी एवमस्तु सुधाम ॥  
 प्रबल दक्षिण विप्र कुल तें सनु कै है नास ।  
 अषित बुद्धि विचार विद्यामान मानै सास ॥  
 नाम राखे मोर सूरजदांस सूर सुस्याम ।  
 भए अन्तरधान वीते पाइ ली निसिजाम ॥  
 मोहि पन सोइ है व्रज की वसे सुख चितथाप ।  
 थापि गोसार्द करी सम आठ मडे आप ॥  
 विप्र प्रत्य जगत को है भाव भूर निकाम ।  
 सूर है नंद नन्द जू को लये मोल गुलाम ॥

Súr Dás was very famous among Hindi poets. He was one of 84 Bhaktas of the Vallabháchárya sect. Vallabháchárya was born in the year 1478 corresponding with the Vikram Era, 1535."

The following papers were read—

1. *Place names met with during the season 1877-78, mostly in the Kávéri delta and Tanjore District.*—By LIEUT.-COL. B. R. BRANFILL, *Depy. Superintendent Survey of India.*—Communicated by COLONEL J. T. WALKER, C. B., R. E., *Surveyor General of India.*

This paper will be published in the Journal, Part I.

2. *Pali Derivations in Burmese.*—By H. L. ST. BARBE, Esq., C. S.  
(Abstract.)

The Burmese have borrowed their alphabet, religion and a great portion of their language from India. The alphabet was no doubt introduced at a very early period. It has never been analyzed in any case, but its square variety approximates more closely to the Aśoka and fifth century B. C. inscriptions than any later Indian modifications. It was adopted *en bloc*, though the Burmese have never themselves found any use for 12 out of 34 consonants, and have altered several of the sounds, notably the 2nd *varga* from "c" and "y" to "s" and "z," the vowel "ai" into "ê" (pronounced more or less like the "e" in there) and the o into ô (like the aw in "law.") The bulk of the Aryan element found its way into the Burmese language through a Pali channel. But Sanskrit words had entered the language before this without any connection with Buddhism. The names for the days of the week are derived from a Sanskrit source, and some other words such as *missa*, a ram, (Sans. *mesha*) *pritta* (Sans. *preta*, the dead) *prassad*, a town, (Sans. for *ásáda*), seem to point to a time when foreign vocables were written down as they sounded in Burmese without reference to their etymology. The importation of those words is due to Indian immigrants who founded kingdoms in Burmah (the Sorehkhetaṛá kingdom was founded B. C. 482) and were the pioneers of civilization there. At present, words of Indian extraction constitute more than one-seventh of the entire Burmese vocabulary. The process of engrafting Aryan vocables on a Mongoloid stock must be more or less clumsy and inadequate. Gautama himself would not understand ten words together of his own doctrine as recited by a *phungyi*, and most certainly will not make himself intelligible to a Burmese audience. The character must always be a most unsatisfactory one to adopt for a new dialect or language, and it is a great misfortune that the Latin alphabet has not been used in reducing the Karen language to writing.

There is, however, a certain method observable in the appropriation of Pali terms. The author has been able to frame a simple set of rules which are tolerably comprehensive, and which may be of some use in dealing with future importations. These rules form the most important part of the paper which will be published in the Journal, Part I.

8. *Prehistoric Remains in Central India.*—By H. RIVETT-CARNAC, Esq.,  
C. S., C. I. E., M. R. A. S., F. S. A., &c.

(Abstract.)

This paper contains an account of the remains discovered by the author in the barrows near Junapani, a hamlet lying about 5 miles to the west of the civil station at Nágpur, in the Central Provinces. These tumuli, which are by the people of the neighbourhood ascribed to giants or to the Gaoli or shepherd kings, regarding whose rule in Central India prior to the Aryan invasion a deep-rooted tradition exists, are surrounded with double rows of trap boulders selected from the masses with which the hill-side is strewn. On those selected stones are found the "cup-marks" resembling those found on exactly similar tumuli in Europe.

The remains discovered were all found in the centre of the barrows. The earth dug through was invariably hard and firm, as if compressed by many centuries into its present compact shape.

The first indication of a "find" is broken pieces of pottery of red and black clay, 2 or 2½ feet below the surface. The fragments of metal implements and ornaments are found, and further pieces of broken pottery, evidently the fragments of urns. With the urns is found a whitish-coloured earth, probably the remains of bones.

In a plate accompanying the paper are represented some iron instruments found in these barrows, among them the best specimen of the battle-axe or hatchet that has yet been discovered. It was found by Mr. Henry Dangerfield in one of the outlying groups of barrows near Junapani. The bands with which the axe was fastened to the wooden handle are in perfect preservation.

Another plate represents six bangles or bracelets found in a mound adjacent to that in which the axe was found.

In a third plate are represented some instruments dug out of a barrow which Mr. Rivett-Carnac supposes to have been the grave of a chieftain. Among them are arrow-heads, axes, spear-heads, a snaffle bit in excellent preservation, and what Mr. Rivett-Carnac supposes to be a pair of iron stirrups.

It is generally supposed that the "cup-marks" are a rude kind of ornamentation. But Mr. Rivett-Carnac has observed on these boulders

which he has examined, a striking combination of large and small cups. He is therefore of opinion that this combination of marks may have some secret meaning yet to be discovered. He remarks that those who are acquainted with the system of printing by the electric telegraph, and the combination of long and short strokes in the Morse code, and the recent arrangements for communicating signals to troops at night, will agree that these marks may have some hidden signification. He connects these marks also with that found in the Kumaon Hills, and described in the Society's Journal for January 1877, believes them in some cases to be the remains of Mahadeo worship.

He thus sums up the results of his paper :

(1.) The sketches shew that the shape of the tumuli in India and Europe is the same.

(2.) The Barrows in India and Europe always face towards the South.

(3.) The remains found in the Indian barrows resemble almost exactly the remains dug out of the burial-places of Europe.

(4) The cup-marks on the boulders which surround the Indian tombs are identical with the marks found on the stones placed round the same class of tumuli in Europe.

The paper will be published in the Journal, Part I.

The PRESIDENT said that he had been until recently under the impression that the stone circles of Nágpur had already been fully described, but that having occasion lately to search for a description of them, he had been unable to find any sufficient account, and he was therefore very glad that Mr. Rivett-Carnac had furnished the necessary details. These curious remains are of peculiar interest and deserve more attention than they have hitherto received. Rude stone monuments, sometimes in the form of circles, sometimes of cromlechs or kistvaens, and occasionally of both together, the connexion being such as to shew that all are probably the work of the same people, have been found in the extreme north-west of India near Pesháwar and in many places in the Peninsula, as at Nágpur, in several parts of the Hyderabad territory, in Mysore, Coorg, on the Nilgiri hills, in Malabar, Coimbatour, Salem, Tinnevely, &c., and near Madras. In Southern India the rings are generally known as Koramba rings, and it is curious, as noticed by Mr. Foote, that near Madras some are formed of laterite, in which, in the same neighbourhood, palæolithic human implements are imbedded. The best descriptions hitherto given of any explorations are those of Capt. Meadows Taylor, who excavated some of the stone circles and kistvaens, here found together, near Ferozabad and Shorapur in the Decan, west of Hyderabad, and gave a full account of his discoveries in the

Journal of the Bombay Branch of the Royal Asiatic Society (Vol. III, Pt. 2, p. 179, and IV, p. 380,) and in the Transactions of the Royal Irish Academy (Vol. XXIV, Antiquities, p. 329.) He found cists containing skeletons, some of them headless, and thus furnished the necessary link between the stone circles of Nágpur, in which enclosed chambers are wanting and the bones appear to have decayed, and the burial-places of the Scythian tribes.

The distribution of these monuments in India is so peculiar and restricted, that they are very probably the tombs of an immigrant race, and not of an aboriginal population. The so-called aboriginal tribes of the country, such as the Gonds, appear, as a rule, to have no knowledge of the remains. If the curious articles supposed by Mr. Rivett-Carnac to be a snaffle bit and stirrups are really what he thinks them to be, they would furnish another connecting link between the circle-building race and the tribes of Central Asia, who have been horsemen from time immemorial, whilst none of the wilder tribes of the Indian peninsula use horses, nor is it probable that the animal is indigenous to the country, the climate of most parts of India being ill-suited for horse-breeding. At the same time it must not be considered as conclusively proved that these pieces of iron are really a bit and stirrups, although the view is probable, especially in the case of the bit.

There is one very striking peculiarity to which I think Mr. Rivett-Carnac has not called attention, but which deserves notice. Mr. Rivett-Carnac has remarked the numerous points in which these circles and the markings upon them shew a connexion with similar remains in Europe. There is, however, one very remarkable distinction. In Europe all such stone monuments as these are classed in the bronze age, the implements of human manufacture found associated being chiefly or entirely of bronze. The occurrence of iron implements in so many cases in India may be due to either of two causes, to the later age of the Indian remains, or to the circumstance that the use of iron was known earlier in India than in Europe. From the extreme paucity of bronze and copper implements in India, it is not improbable that the interval between the time when smoothed stone implements were employed and the discovery of iron was shorter in this country than in Europe, and the relative abundance of iron in Indian tombs may very possibly indicate that the use of the metal was known in India at an earlier period than in Europe.

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## LIBRARY.

The following additions have been made to the Library since the Meeting held in December last.

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**PROCEEDINGS**  
**OF THE**  
**ASIATIC SOCIETY OF BENGAL,**  
**FOR FEBRUARY, 1879.**

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The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th of February, 1879 at 9 o'clock P. M.

W. T. BLANFORD, F. R. S., President, in the Chair.

According to the Bye-Laws of the Society, the President ordered the voting papers to be distributed for the election of Officers and Members of Council for 1879, and appointed Drs. King and Cayley, Scrutineers.

The PRESIDENT then called upon the Secretary to read the Annual Report.

**ANNUAL REPORT FOR 1878.**

In presenting to the Society the customary review of the state and progress of its affairs during the past year, the Council are glad to be again able to report that the condition of the Society is satisfactory, as regards the state of its finances and the interest that continues to be shown in its operations, as evidenced by the accession of members and the number and variety of the communications received for publication.

During the year 1878, 35 new Members joined the Society, a larger number than usual. The losses, by death (9), by retirement (11), and removal (31) amount to 51. The number of Ordinary Members at the close of the year was therefore 327 against 345 in 1877. Of the Ordinary Members 29 are absent from India, so that the effective list now numbers 117 Resident, 153 non-Resident, 15 Foreign and 13 Life Members.

The annexed tabular Statement shows the fluctuation in the number of the Ordinary Members during the past 6 years.

| YEAR. | PAYING. |           |               |         | NON-PAYING. |         | TOTAL. |
|-------|---------|-----------|---------------|---------|-------------|---------|--------|
|       | Total.  | Resident. | Non-resident. | Foreign | Life.       | Absent. |        |
| 1873  | 302     | 116       | 186           | ..      | 3           | 53      | 358    |
| 1874  | 312     | 127       | 184           | ..      | 3           | 32      | 346    |
| 1875  | 292     | 113       | 179           | ..      | 3           | 50      | 345    |
| 1876  | 294     | 119       | 175           | ..      | 5           | 48      | 47     |
| 1877  | 290     | 113       | 163           | 14      | 9           | 46      | 345    |
| 1878  | 260     | 117       | 153           | 15      | 13          | 29      | 327    |

The diminution in the numbers is apparent rather than real, and is due to the lists having previously included a number of individuals who had virtually ceased to be members, and had for a considerable period abstained from paying subscriptions. All such have now been removed from the list of Members, under Rule 38.

During the year one Member compounded for his subscription, and the free life-membership of the Society was granted to Sir E. C. Bayley and General Thuillier on their retirement from India.

The Society has specially to deplore the loss of Mr. H. Blochmann, who had for many years past so ably filled the post of Philological Secretary, and whose researches into the Ancient History and Geography of Bengal, and more especially his labours in connection with the editing of the text and translation of the *Ain-i-Akbari*, and other Muhammadan historical works, have enriched the pages of the Society's *Journal* and *Bibliotheca Indica*, and gained for their author a world-wide renown among scholars. It is greatly to be regretted that by Mr. Blochmann's untimely death a great part of the immense wealth of valuable information that he had collected on these subjects has been lost to the world.

Another serious loss to the Society is Mr. S. Kurz, the author of many valuable papers relating to the botany of India and Burma, and by whose early death the Society loses a zealous contributor, and botanical science an experienced and indefatigable worker.

The Society has also to regret the death in England of Dr. T. Oldham, late Superintendent of the Geological Survey, who was on several occasions President of the Society.

The Obituary further includes the names of Mr. A. Anderson, who had contributed several papers on Indian Ornithology to the Society's *Journal* and other scientific periodicals, Mr. P. T. Carnegy, Mr. T. Chennell, Dr. E. J. Gayer, Mr. C. Heintze, Dr. Verchere, Ordinary Members; M. Garcin de Tassy and Dr. T. Thomson, Honorary Members, and Dr. H. Bleeker, Corresponding Member.

### Indian Museum.

During the past year the Council have received no presentations requiring to be transferred to the Indian Museum under the provisions of Act XXII of 1876. A large number of sculptured stones from the ruins of Buddha Gaya, have, however, been received from Dr. Rájendralála Mitra, Rai Bahádur, C. I. E., which will be transferred to the Museum as soon as a selection has been made from them for the Berlin Museum.

Mr. T. S. Isaac and Capt. J. Waterhouse have continued to act as Trustees on the part of the Society throughout the year. On the vacation of the Presidentship by the Hon'ble Sir E. C. Bayley, K. C. S. I., he was succeeded as ex-officio Trustee by Mr. W. T. Blanford. On the death of Mr. Blochmann, Mr. C. H. Tawney was appointed Trustee, and Mr. H. Beverley took the place of Dr. T. R. Lewis, who went on furlough to Europe.

### Finance.

The Council are glad to be able to report that the financial position of the Society continues in a satisfactory state, and that the accounts of the year show a slight balance of income over expenditure.

The income of the Society from its vested funds will, however, be less in future than it has been during the past year or two, on account of the expiry of the 5½ per cent. loan, and the consequent transfer of the Government Securities held in that loan to the new 4½ per cent. loan. This loss of income will necessitate the most careful economy in the administration of the Society's funds, a point to which the attention of the Council will be duly given.

The gross receipts of the Society during the year amount, as shown in the table below, to Rs. 27,284-9-0 and the gross expenditure to Rs. 20,961-9-11. From the balance, Rs. 6,322-15-1, must be deducted Rs. 976-0-0 for admission fees and Rs. 100-0-0 for compounding fees, both which sums were transferred after the close of the year to the Permanent Vested Fund, leaving a balance of Rs. 5,222-15-1 available for the expenditure of the present year.

The gross receipts are larger than they would have been under ordinary circumstances, owing to the Society having received the whole of the interest due on the 5½ per cent. loan up to its expiry on the 30th April next, amounting to Rs. 10,266-1-5, instead of Rs. 7,308-0-0, the interest due for the year. The difference, Rs. 2,958-1-5, must therefore be considered as part of the income of the current year.

The gross expenditure includes the following items of extraordinary expenditure: under *Publications*, Rs. 928-1-6 remitted to England in advance

for the publication of Mr. Moore's papers on Indian *Lepidoptera* from the collection of the late Mr. C. S. Atkinson. This sum was provided by the sale of Government Securities for Rs. 1,000. Under *Library*, Rs. 1,594-0-0 paid for the preparation of the new Catalogues of Books and MSS. This sum, which should have been met by sale of Government Securities in the Temporary Vested Fund, has actually been paid from current income.

Apart from the interest derived from the vested funds, the ordinary income of the Society shows a further falling off in the two important items of *Subscriptions* and *Publications*, which is to be regretted. The loss is, however, more than made up by an increase in the items of *Library* and *Contingencies*, the increase on the latter head being chiefly the proceeds realised from the sale of the old Museum cases &c.

The receipts from admission and compounding fees amounted to Rs. 1,076-0-0. Rs. 1,100-0-0 have been transferred from the Temporary to the Permanent Vested Fund on this account, and steps will be taken immediately to replace the amount in the Temporary Fund.

At the close of 1877 the outstandings due to the Society for admission fees, subscriptions, sale of publications &c., amounted to Rs. 7,074-5-5. Of this sum Rs. 3,250-9-0 has been written off as irrecoverable. The sum now due from members for arrears of subscriptions &c. amounts to Rs. 2,215-5-0, a great part of which it is hoped may be recovered during the current year.

The net income of the Society amounted to Rs. 20,461-13-9, but from this Rs. 2,958-1-5, the amount of interest received in excess for the half year October to April 1878, should be deducted, leaving a balance of Rs. 17,503-12-4. The ordinary expenditure amounted to Rs. 16,417-15-7. There is thus a balance of Rs. 1,085-12-9 in favour of the Society.

The following is a Statement of the Cash Assets of the Society at the close of 1878:—

|                                |     |     |     |         |    |    |
|--------------------------------|-----|-----|-----|---------|----|----|
| Permanent Vested Fund,         | ... | ... | Rs. | 127,800 | 0  | 0  |
| Temporary ditto,               | ... | ... | ... | 7,200   | 0  | 0  |
| Balance in the Bank of Bengal, | ... | ... | ... | 6,265   | 14 | 11 |
| Cash in hand,                  | ... | ... | ... | 57      | 0  | 2  |
|                                |     |     |     | <hr/>   |    |    |
| Total, Rs.                     |     |     |     | 141,322 | 15 | 1  |
|                                |     |     |     | <hr/>   |    |    |

The following tables will show the Gross Receipts and Expenditure of the Society as compared with the previous year, and also the Net Income and Ordinary Expenditure.



## GROSS RECEIPTS.

|                                    |     |     | 1877.  |    |    | 1878.  |    |    |
|------------------------------------|-----|-----|--------|----|----|--------|----|----|
| Balance of 1876,                   | ... | Rs. | 8,432  | 3  | 5  | 2,694  | 13 | 3  |
| Admission Fees,                    | ... | ... | 880    | 0  | 0  | 976    | 0  | 0  |
| Subscriptions,                     | ... | ... | 7,200  | 2  | 0  | 7,006  | 0  | 0  |
| Publications, ...                  | ... | ... | 1,633  | 5  | 0  | 1,340  | 5  | 0  |
| Library, ...                       | ... | ... | 227    | 5  | 0  | 270    | 11 | 0  |
| Fines &c., ...                     | ... | ... | 47     | 7  | 9  | 42     | 11 | 9  |
| Sale of Government Securities,     | ... | ... | 17,501 | 0  | 11 | 1,045  | 8  | 0  |
| Interest on Government Securities, | ... | ... | 7,583  | 0  | 0  | 10,226 | 1  | 5  |
| Coin Fund, ...                     | ... | ... | 17     | 0  | 0  | 0      | 0  | 0  |
| Loan from Fund <i>a/c</i>          | ... | ... | 1,000  | 0  | 0  | 0      | 0  | 0  |
| Do. O. P. Fund,                    | ... | ... | 0      | 0  | 0  | 2,000  | 0  | 0  |
| Do. Cons. MSS.,                    | ... | ... | 0      | 0  | 0  | 6      | 6  | 0  |
| Refund of postage,                 | ... | ... | 1,033  | 11 | 0  | 957    | 9  | 10 |
| Compounding Fees,                  | ... | ... | 770    | 0  | 0  | 100    | 0  | 0  |
| Contingencies,                     | ... | ... | 21     | 8  | 0  | 618    | 6  | 9  |
| Total, Rs.                         |     |     | 41,346 | 11 | 1  | 27,284 | 9  | 0  |

## GROSS EXPENDITURE.

|                                    |     |     |        |    |    |        |    |    |
|------------------------------------|-----|-----|--------|----|----|--------|----|----|
| Publications, ...                  | ... | Rs. | 8,194  | 15 | 5  | 7,652  | 13 | 5  |
| Library (Purchase of books &c.),   | ... | ... | 3,436  | 13 | 9  | 2,215  | 6  | 3  |
| Do. Extra men for Catalogues,      | ... | ... | 935    | 3  | 0  | 1,594  | 0  | 0  |
| Establishment, Library, ...        | ... | ... | 1,800  | 0  | 0  | 1,497  | 8  | 0  |
| Do. Secretary's Office,            | ... | ... | 2,191  | 0  | 0  | 2,320  | 0  | 0  |
| Secretary's office, Contingencies, | ... | ... | 1,452  | 15 | 8  | 1,201  | 1  | 1  |
| Sale of Government Securities,     | ... | ... | 78     | 8  | 1  | 3      | 14 | 10 |
| Interest of ditto,                 | ... | ... | 18     | 15 | 2  | 25     | 8  | 10 |
| Coin Fund, ...                     | ... | ... | 221    | 10 | 0  | 59     | 8  | 6  |
| Furniture &c.,                     | ... | ... | 8,125  | 15 | 6  | 620    | 13 | 0  |
| Building, ...                      | ... | ... | 7,569  | 13 | 6  | 11     | 4  | 0  |
| Taxes, ...                         | ... | ... | 750    | 0  | 0  | 780    | 0  | 0  |
| Loan from Fund <i>a/c</i>          | ... | ... | 800    | 0  | 0  | 0      | 0  | 0  |
| Do. from O. P. Fund <i>a/c</i> ... | ... | ... | 1,000  | 0  | 0  | 2,000  | 0  | 0  |
| Cons. of Sans. MSS. <i>a/c</i> ... | ... | ... | 1,000  | 0  | 0  | 6      | 6  | 0  |
| Refund of postage,                 | ... | ... | 1,075  | 15 | 9  | 932    | 6  | 0  |
| Copying MSS.,                      | ... | ... | 0      | 0  | 0  | 41     | 0  | 0  |
|                                    |     | Rs. | 38,651 | 13 | 10 | 20,961 | 9  | 11 |
| Balance,                           | ... | ... | 2,694  | 13 | 3  | 6,322  | 15 | 1  |
|                                    |     | Rs. | 41,346 | 11 | 1  | 27,284 | 9  | 0  |

## NET INCOME.

|                        |     |  | 1877.  |    |   | 1878.  |    |    |
|------------------------|-----|--|--------|----|---|--------|----|----|
| Subscriptions, ...     | Rs. |  | 7,200  | 2  | 0 | 7,006  | 0  | 0  |
| Publications, ...      | ... |  | 1,633  | 5  | 0 | 1,340  | 5  | 0  |
| Library, ...           | ... |  | 227    | 5  | 0 | 270    | 11 | 0  |
| Fines &c., ...         | ... |  | 47     | 7  | 9 | 42     | 11 | 9  |
| Interest, ...          | ... |  | 7,583  | 0  | 0 | 10,226 | 1  | 5  |
| Coin Fund, ...         | ... |  | 17     | 0  | 0 | 0      | 0  | 0  |
| Refund of postage, ... | ... |  | 1,033  | 11 | 0 | 957    | 9  | 10 |
| Contingencies, ...     | ... |  | 21     | 8  | 0 | 618    | 6  | 9  |
|                        | Rs. |  | 17,763 | 6  | 9 | 20,461 | 13 | 9  |

## ORDINARY EXPENDITURE.

|                             |     |  |        |    |   |        |    |    |
|-----------------------------|-----|--|--------|----|---|--------|----|----|
| Publications, ...           | Rs. |  | 7,623  | 8  | 7 | 6,724  | 11 | 11 |
| Library, ...                | ... |  | 3,436  | 13 | 3 | 2,215  | 6  | 3  |
| Establishment, Library, ... | ... |  | 1,800  | 0  | 0 | 1,497  | 8  | 0  |
| Do. Secretary's office, ... | ... |  | 2,191  | 0  | 0 | 2,320  | 0  | 0  |
| Interest, ...               | ... |  | 18     | 15 | 2 | 25     | 8  | 10 |
| Contingent charges, ...     | ... |  | 1,452  | 15 | 8 | 1,201  | 1  | 1  |
| Coin Fund, ...              | ... |  | 221    | 10 | 0 | 59     | 8  | 6  |
| Taxes, ...                  | ... |  | 750    | 0  | 0 | 780    | 0  | 0  |
| Postage, ...                | ... |  | 1,075  | 15 | 9 | 932    | 6  | 0  |
| Copying MSS., ...           | ... |  | 0      | 0  | 0 | 41     | 0  | 0  |
| Furniture, ...              | ... |  | 0      | 0  | 0 | 620    | 13 | 0  |
|                             | Rs. |  | 18,570 | 14 | 5 | 16,417 | 15 | 7  |

The following is the estimate for Income and Expenditure during 1879.

## INCOME.

|                               |     |     |        |    |   |
|-------------------------------|-----|-----|--------|----|---|
| Balance in hand, ...          | ... | Rs. | 5,222  | 15 | 0 |
| Subscriptions, ...            | ... | ... | 7,000  | 0  | 0 |
| Publications and Library, ... | ... | ... | 1,600  | 0  | 0 |
| Interest in Vested Funds, ... | ... | ... | 3,235  | 0  | 0 |
|                               |     | Rs. | 17,057 | 15 | 0 |

**EXPENDITURE.**

|                             |     |     |     |       |        |     |
|-----------------------------|-----|-----|-----|-------|--------|-----|
| Publications, ...           | ... | ... | Rs. | 7,000 | 0      | 0   |
| Library, ...                | ... | ... | ... | 3,000 | 0      | 0   |
| Establishment Library, ...  | ... | ... | ... | 1,500 | 0      | 0   |
| Do. Secretary's office, ... | ... | ... | ... | 2,500 | 0      | 0   |
| Contingencies, ...          | ... | ... | ... | 1200  | 0      | 0   |
| Building, ...               | ... | ... | ... | 500   | 0      | 0   |
| Furniture, ...              | ... | ... | ... | 300   | 0      | 0   |
| Coins, ...                  | ... | ... | ... | 200   | 0      | 0   |
| Taxes, ...                  | ... | ... | ... | 780   | 0      | 0   |
|                             |     |     |     | <hr/> |        |     |
|                             |     |     |     | Rs.   | 16,980 | 0 0 |
|                             |     |     |     | <hr/> |        |     |

**The London Agency.**

Messrs. Trübner and Co.'s yearly statement of accounts with the Society from 1st January to 31st December, 1877 showed a balance of £34-2-1 due from the Society. On subsequent examination, this sum was reduced to £33-16-11 and duly remitted.

According to Messrs. Trübner's statement, the sale of the Society's publications during the year 1877 amounted to Rs. 278-6, and that of the Bibliotheca Indica publications to Rs. 545-10. This sum representing £75-11-6 was placed to the credit of the Society and O. P. Fund respectively.

Twenty-four invoices, consisting of publications of scientific Societies presented to the Society, books purchased and books on inspection, were received from Messrs. Trübner and Co. during 1878. The money value of these consignments amounted to £99-6-11. 335 copies of both Parts of the Journal, and 288 copies of the Proceedings, representing respectively a money value of £61-8-4 and £15-12, were despatched to Messrs. Trübner and Co. for sale. 546 copies of the Bibliotheca Indica publications, valued at Rs. 407-2, were also sent for sale.

**Library.**

The additions to the Library during the past year comprise in all 1,326 volumes or parts of volumes. Of these 677 were received as presentations from Government, from authors, or by exchange, and 649 were purchased.

The new Catalogue of the Library, to which reference was made in last year's Report, progressed as far as completion of the cataloguing in the hands of the late Mr. Blochmann. A heavy work of revision and arrangement has yet to be done before the Catalogue can go to press. Mr. H. B. Medlicott has kindly taken charge of the work, and it is hoped that the current

year will see it through the press. As, however, the Council have to rely entirely upon the gratuitous aid offered by already over-worked officers and Members of Council for the effective supervision of such important works, they trust that delays will be excused.

Arrangements have been made with Messrs. Trübner and Co. for the quick despatch by Overland Parcel Post of the periodicals and Journals supplied to the Society, and these now come in monthly or fortnightly parcels instead of being collected and sent out by the P. and O. Steamers.

#### Publications.

The publications of the Society issued during the year comprise 9 Nos. of the Proceedings, consisting of 188 pages of text with two plates; No. 10, with Index, will be ready immediately. Three Nos. of the Journal, Part I, have been issued containing 257 pages of text, illustrated by 24 plates. Of the Journal, Part II, three Nos. have been issued, consisting of 174 pages of text illustrated by 8 plates (5 coloured). No. 4 is well advanced in the press and will shortly be ready.

The Council hoped that the 1st Part of the Extra Number, containing descriptions by Messrs. Moore and Hewitson of the Indian *Lepidoptera* found in the collections of the late Mr. W. S. Atkinson, would have been ready for distribution during the year. Some delay has, however, occurred in the drawing of the plates, and it is uncertain when the first part will be ready.

#### Building.

The amount expended on repairs to the Society's premises and for furniture during the year has been very trifling, amounting only to Rs. 632.

With reference to the erection of the railing in front of the Society's premises, the Council have decided on having the present wall altered and repaired, as they do not consider it advisable to diminish the funds of the Society further at present. The arrangement the Council had hoped to conclude with the Municipality to give a small strip of land to the latter in exchange for a sum that would have sufficed to pay part of the expense of erecting railings has not been carried out, no acceptable proposal having been made by the Municipality.

#### Coin Cabinet.

The accessions to the Coin Cabinet during 1878 were 2 gold, 6 silver, and 41 copper coins purchased; 5 silver Burmese coins presented by the Trustees of the Phayre Museum, Rangoon; one gold and two silver coins received from the Rajah of Suket through the Foreign Office; and 3 silver and 5 copper coins received from Col. C. Martin.

Mr. James Crawford, C. S. brought to the notice of the Council the desirability of a reference being made to Government on the subject of the Treasure Trove Act, in order that the Society might have a chance of purchasing coins &c., found in different parts of the country. The Council accordingly addressed the Government on the subject, and orders have been issued to the Civil authorities throughout the country to inform the Asiatic Society of all finds of coins within their respective jurisdictions. The consequence is, that the Society is constantly receiving intimations of finds of this kind and has been glad to purchase on several occasions. By more recent orders the Asiatic Society is to inform the Bombay Branch of the Royal Asiatic Society of such finds and *vice versa*.

#### Secretary's Office.

Part I of the Journal was in the hands of the late Philological Secretary, Mr. Blochmann, until his death in July, when Mr. C. H. Tawney kindly undertook the duties of the Philological Secretary as a temporary measure. The Rev. Dr. A. F. Rudolf Hoernle was subsequently appointed permanently Philological Secretary.

Captain Waterhouse has continued to hold the General Secretaryship, and charge of the Proceedings, with the exception of 4 months from July to November when Mr. H. B. Medlicott acted for him.

Part II of the Journal has been in various hands during the year. Mr. Lydekker being appointed Natural History Secretary in the early part of the year, relieved Captain Waterhouse and Mr. Blanford of the charge of it; but on Mr. Lydekker's sudden departure in March, those gentlemen again resumed charge of it. During Captain Waterhouse's absence on leave, Mr. Medlicott took charge and the editorship is now held again by Captain Waterhouse and Mr. Blanford.

The Treasurership was held until March by Mr. H. B. Medlicott, who was relieved by Mr. E. Gay. On Mr. Gay's departure for Bombay in August, Mr. H. Beverley was appointed Treasurer and now holds the office.

Mr. G. S. Leonard resigned his appointment as Assistant Secretary in April and Mr. W. E. Bateman was appointed in his place. Mr. Andrews and Babus Kedarnath Bysack, Ramjiwun Mookerjee and Jadu Bindu Bysack have continued to hold the post of Assistant Librarian, Cashier, Assistant Cashier, and Storekeeper, respectively.

#### Bibliotheca Indica.

The progress made in the publication of oriental works has been entirely satisfactory. Altogether 24 fasciculi have been published, including

portions of 9 different works, and three large and important works have been completed. Of the works published, one is an English translation from the Sanskrit, five in Sanskrit, and three in Persian.

The translation above referred to is an elegant and most accurate rendering of the Aphorisms of Sāṇḍilya with the commentary of Sivapneśvara. The Society is indebted for it to Professor E. B. Cowell. The work is devoted to the Hindu doctrine of faith, and forms the text-book of the Bhakti system, which appears in its most developed form in the Bhāgavata Purāṇa, and in the commentary of Rāmānuja on the Vedānta aphorisms of Vyāsa. In many of its salient points it is closely related to the doctrine of the Sūfis. The cardinal principle which the author of the work upholds is, that "knowledge is only the hand-maid of faith and not, as contended by the Hindu gnostics, the only thing needful." The Sanskrit text was originally undertaken by the late Dr. Ballantyne, and on his retirement from India when half of the work had been printed, was completed for the Society by Mr. Griffith, in 1861.

Of the Sanskrit works, the most important is the Sañhitā of the Sāma Veda. It comprises four different works, namely, Grāmageya Gāna, the Uha Gāna, Uhya Gāna and Āraṇya Gāna. These include all the hymns of the Sāma Veda set to music. Inasmuch, however, as the hymns with their musical notations were perfectly unintelligible, the words of the hymns were early separated into a distinct compilation called "Ārchika; or the Richas of the Rig Veda, occurring in the Sāma Veda". This last was commented upon by Sāyaṇa. A recension of this compilation was published by the Oriental Translation Fund of London, in 1842, and another by Dr. Benfey in 1848. Both appeared under the name of the Sañhitā of the Sāma Veda; but as they did not include those peculiarities which convert Rig verses into Sāma hymns, they were, in the form in which they appeared, not Sāmas but Rig verses. The Society undertook, in 1870, an edition of the Sāma hymns, and it has now been completed in 5 volumes. The Rig collection has been adopted as the basis, and to every verse of it have been added all the various transformations which it has undergone in changing from the Rig to the Sāma,—including all the musical notations, as also the commentary of Sāyaṇa on the text. Thus practically the Society's edition comprises six different works, namely, the Ārchika, the four Gānas and the commentary of Sāyaṇa, and the bulk of the edition has necessarily been greatly increased thereby; but it is hoped that it will afford to oriental scholars the most complete edition of the Sāma Sañhitā. The plan adopted has in some places disturbed the order in which the Gānas appear in their respective collections; but this was unavoidable. To remedy the defect full indexes have been supplied at the beginning of each volume. The Council have great

pleasure in adding that the editor, Paṇḍit Satyavrata Samaśramī, has completed the work with commendable zeal, ability and care.

The Agni Purāṇa was taken in hand in 1871 by the late Paṇḍit Harāmohan Tarkabhūṣṇa ; but it was stopped after the publication of two fasciculi. Dr. Rājendralāla Mitra has now completed it in three volumes. The work forms a Cyclopædia of Sanskrit literature, and has been printed from nine different MSS., one of which was obtained from Bombay, one from Tanjore, two from Benares and five from different sources in Bengal.

Of the Society's edition of Hemādri's Chaturvarga Chintāmaṇi, seven fasciculi have been published during the period under report. Four more will complete the second volume, and with it the work will for the present be concluded, as it has not been possible to procure sufficient materials for the remaining 3 volumes.

Paṇḍit Bāla Śāstrī of the Benares College has brought out the sixth fasciculus of the Bhāmati. It is expected that the work will be completed in the course of the current year. Paṇḍit Chandrakānta Tarkaratna's edition of the Gobhiliya Gṛihya Sūtra is also expected to be completed in a short time. The whole of the text has been printed, and two short appendices are now in the hands of the printer.

The Rev. Dr. Hoernle's edition of the *Prithvirāja Rāyasā* has advanced by one fasciculus. The work is a large one, and it will be some time before it can be brought to a conclusion.

The Persian series has sustained a serious loss by the death of Mr. H. Blochmann. Under his able superintendence it was progressing in a most satisfactory manner, and the Council doubt if they will be able to replace him for a long time to come. A little before his death, he had completed the second volume of the text of the Ain-i-Akbari, which is a large 4to. of nearly a thousand pages, got up in a manner that leaves nothing to be desired. Annexed to the volume is an interesting biography of the author, in English. It is to be regretted that the untimely death of the learned editor has deprived the public of the chance of obtaining an English translation of this portion of the work from his pen. An impression appears to exist both in this country and in Europe, that the late Mr. Blochmann before his death had completed this translation. The Council have, however, had a most diligent search made for the MS., but without finding the least trace of it or any allusion to it in Mr. Blochmann's papers, and are therefore inclined to believe that the translation was not completed, and that a confusion has arisen between the completion of the text and translation.

Maulawī 'Abdur Rāhīm has advanced the Society's edition of the Akbarnāmah by one fasciculus, and has also brought out an Index of names of persons and places occurring in the first volume of the work.

The following is a list of the number of fasciculi published during the past year.

*Sanskrit Series.*

1. CHATURVARGA CHINTÁMAṆI, by Hemádri, edited by Paṇḍit Bharatachandra Śiromaṇi. Nos. 391, 400, 401, 403, 406, 407, 410, Vol. II, Pt. II, Fasc. XIII, and Vol. II, P. II, Fasc. I to VI.

2. SÁMA VEDA SAÑHITÁ, with the commentary of Sáyaṇa Áchárya, edited by Paṇḍit Satyávrata Sámāśramí. Nos. 376, 382, 385, 389, 398, 402 413, 414. Vol. V, Fasc. I to VIII.

3. AGNI PURÁṆA, a system of Hindu Mythology and Tradition, edited by Dr. Rájendralála Mitra, C. I. E. Nos. 399, 404, Fasc. XII and XIII.

4. BHÁMATI, a Gloss on Saṅkara Áchárya's commentary on the Brahma Sútras, by Váchaspati Mísra, edited by Paṇḍit Bála Sástří. No. 405, Fasc. VI.

5. PRITHÍRÁJA RÁSAṆASÁ of Chand Baradi, edited by the Rev. A. F. R. Hoernle, Ph. D. No. 408, P. II, Fasc. II.

6. The APHORISMS OF SÁNDÍLYA with the commentary of Svapneśvara, of the Hindu Doctrine of faith, translated by E. B. Cowell, M. A. No. 409.

*Arabic and Persian Series.*

7. AÍN-I-AKBARÍ, by Abul-Fazl-i-Mubárák-i-'Allámí, edited by H. Blochmann, M. A. Fasc. XVII.

8. AKBAR-NÁMAH, by Abul-Fazl-i-Mubárák-i-'Allámí, edited by Maulawí 'Abdur Rahím, Calcutta Madrasah. Nos. 411 and 412, Vol. II, Fasc. III.

9. Index of Names of Persons and Geographical Names occurring in the Akbar-námah, Vol. I, by Abul-Fazl-i-Mubárák-i-'Allámí, edited by Maulawí 'Abdur Rahím.

*List of Societies and Institutions with which Exchanges of Publications have been made during 1878.*

Batavia :—Batavian Society of Arts and Sciences.

Birmingham :—Institution of Mechanical Engineers.

Bombay :—Bombay Branch, Royal Asiatic Society.

——— :—Editor, Indian Antiquary.

Boston :—Natural History Society.

Bordeaux :—Bordeaux Academy.

Buenos Ayres :—Public Museum.

Brussels :—Royal Academy of Sciences.

——— :—Geological Society of Belgium.



- Calcutta :—Agricultural and Horticultural Society of India.  
 ——— :—Geological Survey of India.  
 Cherbourg :—National Society of Natural Science.  
 Christiana :—University Library.  
 Copenhagen :—Royal Society of Northern Antiquaries.  
 Cambridge :—University Library.  
 Colombo :—Royal Asiatic Society, Ceylon Branch.  
 California :—Californian Academy of Arts and Sciences.  
 Dehra-Dun :—Great Trigonometrical Survey.  
 Dublin :—Royal Irish Academy.  
 ——— :—Natural History Society.  
 Edinburgh :—Royal Society.  
 Frankfort :—Natural History Society.  
 Geneva :—Physical and Natural History Society.  
 Genoa :—Museum of Natural History.  
 Königsberg :—Physical and Economical Institution.  
 Leipzig :—German Oriental Society.  
 Liége :—Royal Society of Sciences.  
 Liverpool :—Literary and Philosophical Society.  
 London :—Royal Society.  
 ——— :—British Museum.  
 ——— :—Royal Asiatic Society of Great Britain and Ireland.  
 ——— :—Royal Institution.  
 ——— :—Institution of Civil Engineers.  
 ——— :—Royal Geographical Society.  
 ——— :—Museum of Practical Geology.  
 ——— :—Zoological Society.  
 ——— :—Statistical Society.  
 ——— :—Geological Society.  
 ——— :—Linnean Society.  
 ——— :—Anthropological Institute.  
 ——— :—Royal Astronomical Society.  
 ——— :—Editor, Athenæum.  
 ——— :—Editor, Geographical Magazine.  
 ——— :—Editor, Nature.  
 ——— :—Society of Telegraph Engineers.  
 Lyon :—Agricultural Society.  
 ——— :—Museum of Natural History.  
 Madras :—Literary Society.  
 Manchester :—Literary and Philosophical Society.  
 Munich :—Royal Academy.  
 Netherlands :—Royal Society.  
 New Haven, U. S. :—Connecticut Academy of Arts and Sciences.

New South Wales :—Royal Society.

Oxford :—Bodleian Library.

Paris :—Imperial Library.

—— :—Anthropological Society.

—— :—Asiatic Society.

—— :—Geographical Society.

—— :—Ethnological Society.

—— :—Zoological Society.

Pisa :—Tuscan Society of Natural Sciences.

Stettin :—Entomological Society.

Stuttgart :—Natural History Society of Wurtemberg.

St. Petersburg :—Imperial Library.

———— :—Imperial Russian Geographical Society.

———— :—Imperial Academy of Sciences.

Stockholm :—Royal Academy of Sciences.

Trieste :—Academy.

United States, America :—Geological Survey of the Territories.

Vienna :—Imperial Geological Institute.

—— :—Anthropological Society.

—— :—Imperial Academy of Sciences.

—— :—Zoological Society.

Washington :—Smithsonian Institution.

———— :—Commissioners of the Department of Agriculture.

Yokohama :—German Oriental Society.

———— :—Asiatic Society of Japan.

#### ABSTRACT OF PROCEEDINGS OF THE COUNCIL DURING 1878.

##### *January 30th, Ordinary Meeting.*

A letter was read from the Assistant Secretary, Government of Bengal, forwarding a letter from the Home Department, Government of India, No. 12, dated 3rd January, 1878, stating, with reference to the Society's letter, No. 487, dated 8th August, 1876, that the Governor-General in Council accepts Dr. Rájendralála Mitra's offer to prepare an abstract of Harrish Chandra Shastri's Analytical Catalogue of Sanskrit Books in the possession of the Maharaja of Bikanir at a cost not exceeding Rs. 5000.

The letter was ordered to be recorded.

##### *February 28th, Ordinary Meeting.*

An application for an exchange of publications with the Society of Telegraph Engineers was sanctioned.

A copy of Scudder's Catalogue of Scientific Series was ordered to be subscribed for.

A recommendation of the Finance Committee, with reference to an application from Dr. Rájendralála Mitra for a grant of Rs. 360 for the General Catalogue of the Society's Sanskrit MSS. and Rs. 340 for the cataloguing of the Hodgson MSS., that the latter should be sanctioned, but that the expense for an additional pundit for the former could not be afforded at present, was approved.

On the recommendation of the Secretary, it was ordered that the Society's publications should be sent direct by post to the Royal, Geological, Zoological, and Royal Asiatic Societies in London.

It was ordered that £80 should be remitted to Mr. Grote to meet the expenses of publishing Part I of the descriptions by Messrs. Moore and Hewitson of *Lepidoptera* in the collection of the late Mr. W. S. Atkinson.

With reference to a communication from Mr. J. Crawford, C. S., on the subject of the Treasure Trove Bill, it was ordered that the Government be asked that the Society may be allowed to purchase duplicates of such coins as the Government do not require for their own purposes at the price paid by the Government.

*March 28th, Ordinary Meeting.*

It was ordered that the publications of the Society should be sent by post direct to the Oriental Society of Leipzig and the Asiatic Society of Paris.

*April 25th, Ordinary Meeting.*

A Committee composed of the President, Dr. Rájendralála Mitra, the Hon J. O'Kinealy, T. S. Isaac, Esq. and Capt. J. Waterhouse, was appointed to meet Mr. Metcalfe, and discuss the question of the boundary railings.

An application from the Geographical Society of Halle for an exchange of publications was declined.

A similar application from the Soci  t   Imperiale des Amis d' Histoire Naturelle, d' Anthropologie et d' Ethnographie, of Moscow, was also declined on the ground that the publications were believed to be in Russian.

The question of publishing an Index to Vols. 24 to 46 of the Society's Journal, compiled by Mr. G. S. Leonard, Assistant Secretary of the Society, was considered, and it was ordered that if Mr. Leonard will publish the work on his own responsibility, the Society will take copies to the value of Rs. 500 for distribution.

*May 30th, Ordinary Meeting.*

An exchange of Part II of the Society's Journal for the Archives of the Museum d' Histoire Naturelle de Lyon was accepted.

An exchange of publications with the Royal Society of New South Wales was sanctioned.

The new rules for the Library, drawn up by the Secretary, were approved, with a few modifications.

*June 27th, Ordinary Meeting.*

With reference to the question of a new boundary railing, it was finally decided that as no satisfactory offer had been received from the Municipality, the present wall should be altered and repaired after the rains.

A recommendation of the Finance Committee that Rs 1000 worth of Government Securities should be sold to meet the expense of the Atkinson papers was sanctioned.

*August 1st, Ordinary Meeting.*

Mr. H. Blochmann having resigned the Trusteeship of the Indian Museum, Mr. E. Gay was appointed a Trustee on behalf of the Society.

The following minute was recorded on the death of Mr. H. Blochmann, Philological Secretary of the Society.

“The Council desires to place on record its sense of the very great loss that the Society and Oriental literature have sustained in the death of Mr. Blochmann, and to express its deep regret at the sad event that has deprived the members of so valuable and estimable a colleague.”

Mr. C. H. Tawney was appointed Philological Secretary temporarily.

Mr. E. Gay having resigned the Treasurership on his departure for Bombay, Mr. H. Beverley was appointed in his place.

Applications from the Industrial School of Distritz and the United Service Institution of India for an exchange of publications were declined.

A Committee composed of Messrs. O’Kinealy, Croft, Dr. R. L. Mitra, Babu Prannath Pandit, the President and Secretaries was appointed to collect subscriptions for a memorial to the late Mr. Blochmann.

*August 29th, Ordinary Meeting.*

Mr. C. H. Tawney was appointed a Trustee of the Indian Museum in place of Mr. E. Gay.

The recommendation of the Finance Committee that the Society’s  $5\frac{1}{2}$  per cent. Government Securities should be transferred to  $4\frac{1}{2}$ , was approved and confirmed, and the Treasurer ordered to effect the transfer.

An offer from Mr. C. J. Lyall to continue the editing and publishing of the Persian text of ‘Amar Khayyám was accepted with thanks.

*September 25th, Ordinary Meeting.*

In reply to a letter from the Society of Telegraph Engineers a copy of the Ronald’s Catalogue was ordered to be subscribed for.

Read a letter No. 200, dated 31st August, from the Under-Secretary to the Government of Bengal, stating that the Lieutenant-Governor approves of the manner in which the Government grant for cataloguing Sanskrit MSS. had been applied.

Mr. H. Beverley was appointed a Trustee of the Indian Museum in place of Dr. T. R. Lewis, resigned on leaving India.

*October 31st, Ordinary Meeting.*

The publication of Lieut. R. Temple's Grammar of the S. Andaman language was declined from want of funds.

*November 28th, Ordinary Meeting.*

In reply to a letter from Messrs. Newman and Co., asking if the Society had promised to take copies of Mr. Leonard's Index to the Journal, they were ordered to be informed that if the Index were published, the Society would be prepared to take copies to the value of Rs. 500, provided it meets with the approval of the Council.

The Mali and Bearer were ordered to receive a temporary increase of 1 Rupee each per mensem for November and December.

The PRESIDENT then delivered the following address—

PRESIDENT'S ADDRESS.

The close of the period for which you have done me the honour of entrusting me with the Presidency of your Society brings with it the occasion of reviewing briefly some of the incidents of the past year, and of offering a few remarks on some of the scientific questions which have from time to time attracted the attention of our members. In the great Societies of Europe, where the subjects discussed are of cosmopolitan interest, it is not an unusual proceeding to review the progress of human thought generally or of the particular branch to which each Society devotes itself, during the course of the preceding twelve months, but situated as we are, at a distance from the greater centres of scientific activity, we shall best do service to the general cause by confining ourselves to the area of the continent from which our Society derives its name, and more especially to the country in which we live.

To review the various discoveries made during the year, and to afford anything like an adequate sketch of their scope and meaning, is indeed a task far beyond the powers of any individual. The year commenced with that marvellous triumph of mechanical resource, the liquefaction, simultaneously and independently by two different chemists, of the only gases which had hitherto resisted all attempts to induce them to change their gaseous state, and terminated with Mr. Norman Lockyer's spectroscopic analyses of the metals, analyses so singular as to have led to the announcement, more sensational than accurate, that the decomposition of bodies hitherto supposed to be elementary had been effected, and even in the columns of newspapers to the suggestion that the old alchemist's dream of transmutation had come true. Great additions have been made in the course of the

twelvemonth to the remarkable series of discoveries of which the telephone was the first-fruits and the phonograph and microphone some of the results, and in astronomy one if not two planets have been shewn to exist, on far more satisfactory evidence than any previously existing, within the orbit of Mercury. There has been no lack of scientific energy, and the results have been in proportion to the labour, the correspondence between power expended and work done holding good in mental as in material dynamics. In Europe and America, where the workers are many, the advance in scientific thought is great. Here in British India and its dependencies, the labourers are comparatively few, and the results are consequently small, but it will be well to pass some of these briefly in review, and try to ascertain what the labours of the year have added to our knowledge.

There is one feature in which almost all scientific work in India differs from that in Europe and America, and especially from the work done in the British Islands and in the United States. In the west nearly all that is effected is due to the labour, entirely spontaneous, and for by far the greater part unremunerated, of private individuals, or of associations like our own; very little is due to the initiation of the ruling power, however willing the Government may be, in some cases, to aid and extend exploration already commenced. In India, although Societies like the Asiatic are not directly subordinate to the Government of the country, by far the larger proportion of our members are officers of the Government, and, in many cases, are officially engaged in scientific enquiries. Hence no small portion of the scientific work of the year, instead of being due to private research, is the result of investigations made for the Government of the country by its own officials, and consequently a review of the year must deal largely with national rather than individual undertakings.

To the members of the Asiatic Society, and especially to those resident in Calcutta, perhaps the most interesting incident of the past year has been the opening of the new Indian Museum. The ornithological and reptilian and the archæological galleries were thrown open to the public on the 1st April, and the mammalian gallery in December. The collection of specimens in spirit is arranged in cases and nearly ready for exhibition, and a portion of the beautiful Buddhist railing from Bharahut has been set up in the archæological gallery in the room to the south of the entrance. Very much still remains to be done; the ethnological collection has not yet been provided with cases, although arrangements have been made by the Trustees to meet the expense, and the archæological collection, almost entirely transferred from the Society, is still unarranged and unprovided with stands; but for this also provision has been made by the Government. But seeing the progress that has already been made, and considering how great has been the labour necessary, I think that very much has been accomplished

by Dr. Anderson, the superintendent, and by his staff of assistants, especially by the taxidermists' department under Mr. Fraser, in the course of the last year. To the members of the Society it must be a source of gratification to see the superb collections made by themselves and their predecessors fairly exhibited in well-lighted galleries, instead of being hidden in small rooms, as they formerly were, and the value of the collections can be much better appreciated since it has been possible to see and examine them.

The geological galleries at the Museum, which were finally opened to the public from the 1st of January, 1878, had been ready for exhibition for some time before, and even temporarily thrown open, but they required much less preparation, and more superintendence was available, amongst the officers of the Geological Survey, for the important work of arrangement. Although the Society's specimens form a much smaller element of the geological than of the zoological, archæological, and ethnological collections, no unimportant part, both of the fossils and minerals, was the property of our association, the most valuable amongst the specimens derived from the Asiatic Society being probably the Siwalik mammalian remains, and the series of meteorites, both of which occupy a conspicuous position in the new galleries.

The Zoological Gardens of Calcutta continue to flourish, and although, like other gardens of the same class, they are rather adapted for recreation than for study, it is a question whether this is not an advantage, for the number of students is so limited in India, that education is needed more than opportunities for original investigation. Several rare Indian animals have already been exhibited, and it is to be hoped that the number will be increased.

Passing now from the more local subjects of interest and turning to those of wider scope; first and foremost of all research in India, as the ground-work upon which so many other sciences depend, is our knowledge of the topography of the country and of neighbouring regions. The first branch of enquiry progresses satisfactorily in the hands of General Walker, and his able assistants of the trigonometrical and topographical surveys, and if the second is still far from what we could desire, some advance has been made, thanks to the officers of the same survey. Some important progress, to which I will refer presently, has been achieved in trans-frontier exploration, and almost the only scientific use hitherto made of the Afghan expedition has been the extension of geographical surveying.

But it is impossible not to regret that our present information is not wider. It is difficult to cast a glance over the map of India and not be struck by the hard sharp line that divides, on so many of our frontiers, the known from the unknown. Despite the new treaty with China, Tibet



is still forbidden ground, and apparently awaits the advent of Colonel Prejevalski, or some other adventurous traveller from the distant regions of Northern Asia, to trace out the upper waters of the rivers that irrigate British India. We can but hope that it will not long remain a national reproach to us that we have less knowledge of the rivers of India than of those of Africa, and that the sources of the Nile and Congo have been explored before those of the Brahmaputra and Irawadi. There is no lack of willing and able explorers, but as the opposition in this case comes not from savage tribes or individuals, but from a fairly civilized Government, it can only be overcome by the action of the ruling power in India. There is no subject at the present time in which more general interest is taken than in the progress of geographical exploration. That there are difficulties in the road of research is unquestionable, but whatever may be the case in politics, it is certain that difficulties in science are not conquered by 'masterly inactivity.'

It is not likely that Tibet will long remain untrodden by European feet. Colonel Prejevalski, far from being discouraged by his two previous failures, failures, however, which have contributed more to our knowledge of Central Asia than any other recent travels, is again about to set out for Lhasa. Nor is he the only traveller who is endeavouring to reach the centre of Mongolian Buddhism, for an Austrian, Count Szechenyi, is about to leave Peking for Tibet under peculiarly favourable conditions. But we hear of no British exploration, and we can only regret that the Government of Great Britain appears desirous of leaving the examination of countries almost within sight of its own mountains to Russian or German travellers. It is impossible that the inhabitants of the country should not contrast Russian energy with British apathy, and the result can scarcely be favourable to the diplomatic reputation of our own Government.

Although Tibet has not been explored nor even entered by any European, something has again been added to our knowledge of its geography by the employment of trained natives, and a step in advance has been made by the determination of the quantity of water passing down the different Assam rivers in the dry season, for the purpose of ascertaining which receives the drainage of the Tibetan plateau. The measurements have been made by Lieut. Harman, R. E., of the Great Trigonometrical Survey, and serve to shew clearly that the Tibetan river cannot be the Subansiri, and that it is probably the Dihong. I have just been informed by Genl. Walker that a native sent by Lieut. Harman to Tibet for the purpose of endeavouring to trace the Sanpo to the eastward, had returned after having followed the river to a point where its course turned southward nearly north of the spot where the Dihong emerges from the mountains into the Assam valley.



All therefore tends so far to support the view taken by the officers in the Great Trigonometrical Survey, and to shew that the Sanpo and Dihong are identical. At the same time the question cannot be considered settled until the two rivers are actually traced into connection with each other.

We may hope for large additions to our knowledge of Afghanistán from the present expedition. I regret to say that hitherto the endeavour to take advantage of the presence of a British army in Afghanistán for purposes of scientific enquiry has been limited to the despatch of surveying parties, but I hope this will not continue to be the case, and that so favourable an opportunity for extending our knowledge of the Archæology of a most interesting region, and for examining the Ethnology, Geology, Zoology and Botany of Afghanistán, will not again be allowed to pass away without being used. I am indebted to General Walker for the information that Major Tanner of the Survey Department has discovered, near Jellalabád, some relics of the old Káfir (pre-Muhammadan) rulers, and more particularly has found a subterranean palace, which has been already partially excavated. He has also made enquiries about those mysterious people, the inhabitants of Káfiristán, and finds that there are at least ten dialects of the Káfir language: of these dialects which, as might be supposed, are Aryan, he is making a glossary. It is greatly to be hoped that Major Tanner will succeed in visiting Káfiristán, a region which has for so long been an object of interest and enquiry, and which was strangely neglected when formerly access was possible. It is not probable that there will be much difficulty in going thither, as the inhabitants are believed to be friendly, and tried to induce English officers to visit them during the former occupation of Cabul.

On some of the other land frontiers of India good progress is being made in the work of surveying. In Burma and Assam, where the difficulties caused by dense forest, one of the worst enemies a surveyor can meet, are at their maximum, there is a steady advance in the triangulation.

The regular work of the Trigonometrical Survey has but little general interest, although it is laying the ground-work for every variety of knowledge, and the details of topography are even less exciting, but the Survey is certainly to be congratulated on the production of maps such as those of Guzerat. Scarcely any one in the country has so good opportunities of testing the accuracy of map-drawing as have the officers of the Geological Survey, and the maps of Kattywar on the scale of an inch to the mile are described as excellent.

But, besides exploration and mapping, there are several branches of scientific enquiry on which the officers of the Great Trigonometrical Survey are engaged. One of these,—a question of far greater practical importance that it appears at first sight,—is the determination of the exact differences

in longitude between distant countries, and especially between England and India, by means of the electric telegraph. This has resulted in the correction of the longitude of Madras, previously ascertained by very long and tedious astronomical observations, extending over many years, by 31·8 seconds of time or rather more than half a mile of distance in this latitude. No addition has been made during the past year to the work described in the Report of the Survey for 1876-77, both the officers engaged, Major Campbell and Captain Heaviside, having been absent on furlough. Another question to which much labour has been devoted by the Survey is the establishment of bench-marks throughout several parts of the country by means of careful spirit-levelling. The vast importance of such marks for engineering works and especially for all plans of irrigation is manifest, and it is not improbable that the scientific importance of the levels will increase greatly, as, in connection with a series of other observations at tidal stations, they will afford data for determining whether changes in the elevation of land are taking place in different parts of the country.

Amongst the numerous subjects to which the officers of the Trigonometrical Survey have directed their attention, some of great interest have been described, at Genl. Walker's suggestion, in the Journal of the Society for the past year, and it may fairly be hoped that the publication, in this form, of observations such as those made for the purpose of determining the mean sea-level in the Gulf of Cutch, may serve the purpose of making the results more widely known than if they were recorded only in an official report, whilst the Journal of the Society gains in interest and value by being made the medium of publication. The paper by Lieut Harman, to which I have already alluded, on the results of measurements of the Assam rivers, will, I hope, be read this evening.

Few plans for recording the advancement of any enquiry are more trustworthy than a comparison of the methods employed in delineating the results: careful observations require for their record neat and accurate drawing, and facility of reproduction. Thus the account given by Captain Waterhouse in our Journal of the various photographic methods employed in the reproduction of maps and plans, whilst dealing solely with the art of map printing, shews indirectly the great advance of the science of Geography in India, and the demand for more accurate knowledge of the surface of the country. The progress of the whole art of Government in India during the last thirty years, and the change from comparative ignorance to more accurate knowledge, could not be better illustrated than by a comparison of the maps produced at the commencement of the period, and those now issued, and it may safely be asserted that the increase in the accuracy of the maps is at least equal to the improvement in map printing.

The work of the Marine Survey under Captain Taylor, I. N., is still greatly restricted by the want of a proper vessel, and until the steamer now being built at Bombay is completed, it is not possible that any important additions can be made to our knowledge of the Indian seas. Meantime, however, some most useful charts have been published, and several harbours, roadsteads, and tracts of the coast have been surveyed. For a knowledge of the true contour of the sea bottom in the neighbourhood of India, and for the investigation of all the interesting problems in geology and zoology that may be solved by means of the sounding line and dredge, we must still wait for the new vessel, which I am happy to say will be fully provided with the necessary apparatus, and which, in the hands of Captain Taylor and Lieut. Jarrad, may be expected to add to the magnificent series of discoveries due to the "Challenger" expedition. The seas of India are as yet untouched, and as the country itself has had a peculiar and exceptional geological history, it is not improbable that the depths of the surrounding ocean may harbour many forms of life not existing in the other oceanic tracts. Some of those curious questions as to the course of the great oceanic currents, questions upon which, undoubtedly, the distribution of temperature and rainfall largely depends, may receive their solution in an area where access from one polar region is entirely barred, and thus the conflicting effect of two sources of cold water is not present, as in the Atlantic and Pacific Oceans, to disturb the observations made.

The subject of deep-sea dredging is one to which the attention of the Society was first directed several years since, and the Council has never ceased to urge the importance of it. It may be hoped that there is at last a prospect of useful exploration. For geological purposes and for comparison with the marine fossils of the tertiary formations, a series of the invertebrata and especially of the mollusca, echinoderms and corals of the Indian seas is essential, and for much aid in obtaining such a collection we look to the Marine Survey.

The field work of the Geological Survey for the past year has not been very prolific in results of interest, and, as in the larger field of the Trigonometrical Survey, the importance of the work is due chiefly to its being part of a connected system. Some valuable additions have been made to our knowledge of Káshmir, Hazára, Bannú and some other portions of the Punjab, Kumaun, Rájputána, Chutia Nágpúr, Kattywar, the Godávári valley, Tanjore and the islands of Rámri and Cheduba, but in no case are the details such as greatly to alter the conclusions previously formed. The only published number of the "Memoirs of the Geological Survey" contains a paper by Mr. Ball on some previously unexplored coal-fields in Palamau (Palamow), and of this paper the interest is rather practical than scientific, although some interesting details are given as to the distribution of certain lower Gondwá-

na formations beyond the Damuda valley, to which they were previously supposed to be restricted. A much longer and more important paper by Mr. Wynne on the Salt Range of the Punjab would have appeared, but for delay in the preparation of maps. All the principal facts and conclusions in this memoir had, however, been published previously in short notes contained in the 'Records of the Geological Survey' and elsewhere.

The 'Records' for the past year exceed the 'Memoirs' both in bulk and in importance, and several of the papers add materially to the knowledge previously existing. Perhaps the most important in their bearing upon physical geology are Mr. Lydekker's and Colonel McMahon's contributions to the geology of the north-west Himalayas. Many circumstances have concurred to delay the geological examination of the Himalayan chain, and thus it has happened that Káshmir, which, it might have been thought, would have attracted the earliest attention from the Geological Survey, has remained so long imperfectly known. For what has hitherto been ascertained we are chiefly indebted to Col. Godwin-Austen and the late Dr. Verchere, for although an excellent geologist, Mr. Drew, was for years resident in the country, in the service of the Mahárája, he was prevented by his official position from publishing the observations he made, and his opportunities of examining the country were much restricted.

Mr. Lydekker has now traced several points of connexion between the series of formations determined by Dr. Stoliczka in Spiti, Rupshu and Ladák, and the rocks of Káshmir, Kishtwár and Pángi, and has in some cases modified the conclusions formerly arrived at, especially with regard to the very complicated relations of the metamorphic rocks. There is still much to be done before the relative ages of the latter are determined with certainty, but it seems clear that gneissic rocks of two different systems, distinct both in origin and in period of metamorphism, exist both in Káshmir and Ladák, that the slates and bedded volcanic rocks, so abundantly developed both north and south of the Káshmir valley, are of older palæozoic age, and although they have hitherto proved unfossiliferous, that they must be considered to represent the Silurians of Spiti and Hundes, and that all the different limestones of the Pir Panjál range, including the great bed of the Jamu hills, are probably carboniferous, like the fossiliferous limestones of the Káshmir valley.

Not the least interesting of Mr. Lydekker's observations refer to the physical structure of the mountains. He has shewn that the Káshmir valley is a compressed synclinal ellipse, and consequently similar in its main features to the area already described by Dr. Stoliczka further to the eastward in Spiti and Ladák, although in the latter region newer rocks appear than are found in Káshmir, where the highest beds occurring are triassic. The Pir Panjál range, to the south of the Káshmir valley, is shewn to be a

great anticlinal flexure, with all the beds on the southern side inverted, as they so commonly are along the southern base of the Himalayas. A smaller synclinal ellipse occurs south-east of Káshmir on the upper Chináb in the Pángi district. To all these facts attention has been especially directed by Mr. Medlicott, the Superintendent of the Geological Survey, in his annual report for 1877, and he notices especially how the recurrence, in the north-western Himalayas, of a series of synclinal ellipses, formed of sedimentary beds and having their longer axes parallel with the main direction of the mountain range—each ellipse being isolated from the others by intervening ranges of metamorphics,—tends to shew that the different basins were all originally part of one sedimentary area, and that their present isolation is due to disturbance and denudation. Nevertheless some subsequent observations to the north of Simla are in favour of partial separation in early palæozoic times having subsisted between the two important sedimentary tracts of Spiti and Hundes.

Colonel McMahon's paper on the rocks of the Simla area was published in 1877, but it has been supplemented by another, now in the press, on the Central Himalayan region to the north of Simla. These contributions to the geology of the Himalayas are deserving of more than a passing notice. It is but rarely in India that any one beyond the limit of the Geological Survey possesses both the inclination and the opportunity to investigate the geology of the country, and it may be added that the physical geology of the Indian Peninsula in general is chiefly remarkable for monotony and want of interest. When a new observer arises amongst us and proves himself not only able but willing to examine such very difficult problems as those presented by the complicated formations of the Himalayas, all interested in geology must welcome so valuable an addition to our strength. One of the greatest drawbacks to scientific progress in this country is the want of external criticism, and the worthlessness of much of such criticism as is offered; too frequently it happens that such remarks as appear, whether laudatory or adverse, serve chiefly to shew the ignorance of the critic. Hence arises a professional intolerance of criticism, and a disposition to dogmatize. Had we but a few more independent observers like Colonel McMahon, the progress of Indian geology would be far more rapid.

There are few tracts in the Himalaya more puzzling than the Simla area. North of the Sutlej lies the great band of ancient metamorphic rocks, called the Central Gneiss by Stoliczka, and beyond this again to the northward is the great sedimentary series of the Spiti valley, containing marine fossiliferous rocks of silurian, carboniferous, jurassic, triassic and cretaceous age, the lowest of which beds form the peaks of the snowy range. South of the band of central gneiss none of these fossiliferous rocks have been

found, but a series of sedimentary beds occur, long since classed and described by Mr. H. B. Medlicott, in descending sequence, as Krol, Infra-Krol, Blaini, and Infra-Blaini. With these sedimentary beds gneiss is associated, and two difficulties have hitherto attended all attempts at determining the position and relations of the Simla rocks; the first being that the sedimentary beds, in places, appear to be distinctly lower in position than the gneiss, and the second that no clear connexion can be traced between the sedimentary unfossiliferous beds to the south of the snowy range, and the fossiliferous series to the north. Stoliczka considered that the gneiss of Simla was newer than the central gneiss, and that the Krol limestone, the most characteristic bed of the Simla area, represented the Lilang triassic limestone of Spiti. Mr. Lydekker suggested on the other hand that the Krol limestone was probably the same as that of the Pir Panjál, and consequently carboniferous. Col. McMahon confirms Stoliczka's views as to the resemblance between the Krol and Lilang limestones, but has shewn, on what appears to be clear evidence, that the gneiss of Simla and the 'Central Gneiss' are identical, and that the apparent superposition of the gneissic rocks on the sedimentary series near Simla is due to the original deposition of the latter in valleys or other hollows worn out of the surface of the former, and to the subsequent great compression of the whole area, and partial metamorphism of the sedimentary rocks. These views, worked out with much care, suggest a similar explanation of those singularly anomalous sections in Sikkim in which, as Mr. Mallet has shewn, there appears, on all sides of the mass of hills around Darjiling, to be a gradual passage in an ascending section from unaltered Damuda sandstones and shales, containing coal seams and fossil plants, to quartzites and slates, and from these to gneiss.

Another Himalayan paper by Mr. Ball refers to the origin of Naini Tál and the other lakes of Kumaun. The peculiarity of these lakes is due chiefly to the paucity of similar accumulations of water throughout the lower Himalayas in general; in the higher Himalayas lakes are common enough, and are, in numerous cases, clearly due to glacial action. Mr. Ball considers that the Kumaun lakes are not of glacial origin, but caused by landslips, as are a few other lakes in the lower Himalayas. The question cannot, however, be considered as definitely settled, for Mr. Theobald, who has recently examined the neighbourhood of Naini Tál, has come to a conclusion exactly the reverse of Mr. Ball's.

A subject of some interest has been discussed by Mr. Mallet in a paper on the 'mud-volcanoes' of Ránri and Cheduba, in which he shews, on what appears to me to be unanswerable evidence, that nothing resembling igneous volcanic action has been exhibited by these vents, and that they are due to the evolution of gaseous hydrocarbons, accompanied by water and small



quantities of liquid hydrocarbons, such as petroleum; both the gases and petroleum having been formed by the decomposition of vegetable tissue contained in the tertiary rocks of the islands. Several severe and paroxysmal eruptions are on record, accompanied by earthquakes, and during these eruptions, the gases, which are of course inflammable, have frequently been ignited, but this is a very different phenomenon from the ejection of red-hot lava and scorix. The cones of the mud-volcanoes are composed of clay, derived from the beds traversed by the gas on its way to the surface, mixed with water, and driven out by the gas. This determination of the non-igneous nature of the Rámri and Cheduba mud-volcanoes coincides with the observations made on similar vents in upper Burma and in Baluchistán, and shews that the idea, so frequently put forward in geographical and geological works, that the great line of volcanoes, which traverses the Malay Archipelago, terminates in Rámri, is erroneous. The northernmost extremity of the volcanic chain in question is probably to be found in Barren Island, and may have some connection with the isolated extinct volcanoes of upper Burma and Yunan.

There are still three other subjects discussed in different papers in the Records of the Geological Survey for 1878, each of which is illustrated by a number of the "*Palæontologia Indica*" published during the year. Two of these subjects are intimately connected, both being stages in the investigation of that extraordinary series of sandstones and shales, so largely developed in south-western Bengal and the Central Provinces, and chiefly known from comprising all the coal deposits of the peninsula. This remarkable system, comprising the Tálchir, Damuda, Panchet, Mahádeva, Jabalpur and other groups or series, and now known by the collective term of the Gondwána system, has long attracted much attention, no less on account of the rich seams of coal and ironstone that it contains, than because of the peculiarities of its fossil fauna and flora, and a discussion, by no means ended as yet, has arisen, as to the relations between this fauna and flora and those found in various rocks of Europe and Australia.

It must be remembered that the data on which the geological history of the earth, as shewn by fossiliferous rocks, has been determined, chiefly consist of marine organisms, and that, although it cannot be positively stated that beds at remote spots on the earth's surface, if containing an assemblage of the same or of similar organisms, are of exactly contemporaneous origin, yet the fact, that the succession of marine life in all countries hitherto examined has proved to be the same on the large scale, is in favour of the view, that all deposits containing the fossils of one epoch, such as the jurassic, were formed at a period subsequent to the disappearance of forms of the previous epoch, such as the triassic. At all events no instance is as yet known in which a purely older fauna occurs in a bed of clearly later date

than another containing only the forms of a later epoch, and perhaps the nearest approach to such an anomaly is in Barrande's well known 'colonies' of lower silurian fossils apparently overlying upper silurian. I am not sure that this case of interposition can be yet considered as decided, but admitting the fact, as contended for by Barrande, the difference between upper and lower silurian is not equivalent to the difference, for instance, between silurian and devonian, much less to that between silurian and carboniferous, the next great and typical series in ascending order, nor can the change be compared to that between triassic and jurassic rocks. The freshwater and land organisms of past times, both vegetable and animal, are, however, far less thoroughly known than the marine, and it appears to have been assumed rather than proved that their succession has been as uniform throughout the land surface as has that of marine beings in the sea.

Now in the Gondwána system, with one or two exceptions in the upper subdivision, the only organic remains found are terrestrial or fluviatile, plants being much more common than animals. The few animals traced are chiefly reptiles, amphibia or fish, but these are of great interest, because similar forms, owing to their biological importance, have been very carefully examined and described almost wherever they have been found.

The animal remains have only been found in a few parts of the country. One of the richest of these is in the Panchet beds of the Rániganj coal field; another is in the neighbourhood of Sironcha, at the junction of the Pránhita and Godávári rivers. In this last-named country there are several localities, at one of which, near the village of Kotah, remains of several species of ganoid fish have been found in limestone, whilst at another, close to a village site called Maleḍi, teeth and bones of reptiles and fish have been discovered in red clay. The part of the 'Palæontologia Indica' to which I have referred contains descriptions of some of the Kotah fish by Sir P. Egerton, and of the teeth of *Ceratodus*, another fish found at Maleḍi, by Mr. Miall, together with a brief note of my own upon the deposits in which the fossils occur. In the 'Records' is a paper by Mr. Hughes describing the geology of the upper Godávári basin, between the river Wardha and the Godávári near the civil station of Sironcha. Now Sir P. Egerton has shewn that the Kotah fish belong to the genera *Lepidotus*, *Tetragonolepis* and *Dapedius*, and are typically lower jurassic (liassic) forms. The *Ceratodus* from Maleḍi and some other places is very closely allied to a triassic species, and it is associated with two reptiles, *Hyperodapedon* and *Parasuchus*, both triassic types. It is therefore very startling to find that Mr. Hughes is of opinion that the Kotah limestone is a bed of the Maleḍi deposits, and that the two are in fact identical.



If this case stood alone, taking into consideration the great difficulty of surveying in the neighbourhood of Sironcha, on account of the very imperfect manner in which the rocks are exposed, and the prevalence of forest, it would be reasonable to doubt Mr Hughes's conclusions, the more so as Mr. King, who also examined the ground, and who at first thoroughly endorsed them, has since expressed some slight doubts, although these doubts appear due rather to Palæontological than to Geological considerations; but somewhat similar contradictions in homotaxis occur amongst the fossil plants of several Gondwána groups. The collections which have accumulated in the course of the last 25 years are now being examined and described by Dr. Feistmantel, who has already published accounts of most of those found in the upper Gondwána beds. One fasciculus of the "*Palæontologia Indica*," containing the plants of the Jabalpur group, appeared during the past year, and the flora was shewn to be closely allied to that found in middle jurassic (lower oolitic) beds in Europe. But some of the same plants have also been found in the Maledi beds associated with the triassic fish and reptiles. Other plants from the Maledi beds, it is true, indicate a lower horizon, but still one superior to the trias. Again, in Cutch, some of the Jabalpur plants recur together with others, all allied, like those of Jabalpur, to middle jurassic types in Europe; yet the plant beds overlies marine rocks abounding in upper jurassic mollusca. Last of all, the Indian coal measures or Damuda series, which are of lower Gondwána age, contain a flora considered by several botanists to be jurassic, but lately classed by Dr. Feistmantel as triassic. This flora, however, is most closely allied to one occurring in Australia in beds associated with others containing marine carboniferous fossils.

It may, I think, safely be inferred from these anomalies in the distribution of ancient terrestrial and fluviatile organisms in India, that such types did not exist at the same epoch as their nearest allies, often not to be distinguished in the fossil state, in other countries, and that the succession of life on land was less uniform than in the ocean. The fact that land regions at the present day, under the same parallels of latitude and enjoying the same climate, are distinguished by far more striking differences in their fauna and flora than marine provinces are, and that in some land regions, as in Australia, types have survived and even predominate, which in other parts of the earth's surface appear to have died out at distant past epochs, is quite in accordance with this view. It follows as a corollary that land plants and animals cannot be accepted as evidence of geological age with the same confidence as marine forms can.

It must not be supposed that the opinions just expressed are generally accepted. They are disputed by Dr. Feistmantel himself and by other

palæontologists. I think, however, the facts of the case must ultimately lead to conviction. It is of course impossible to describe the whole evidence here; a fuller account will be found in the 'Records of the Geological Survey' for 1878, in a paper on "The Palæontological Relations of the Gondwana System." But precisely the same important conclusion, the want of uniformity in the succession of terrestrial forms of life in distant countries, is enforced by the Siwalik fauna, the third subject to which a fasciculus of the 'Palæontologia Indica' and a paper in the "Records of the Geological Survey," both by Mr. Lydekker, have been devoted. The value of the part of the 'Palæontologia' is, I regret to say, much diminished by the inferiority of several of the lithographs, but the artistic difficulties to be encountered in this country are well known.

The importance of Mr. Lydekker's work on the Siwalik and other tertiary mammalian fossils may be easily appreciated by the circumstance that very large additions, many of them from new localities, have been made to the original collections described by Dr. Falconer, that Dr. Falconer's descriptions were extremely incomplete, a very large proportion of them, including nearly all the details, having only been printed after his death, and having been kept back by him for years with a view of rendering them more perfect, and that the Siwalik mammalian fauna appears to be far richer than any existing, and perhaps than any other assemblage of fossil mammalian remains hitherto examined. Although very few bones of animals inferior in size to a pig or a sheep are found, although no bats or insectivora and but 8 species of rodents have been discovered, no less than 84 species belonging to 45 genera have been detected and described up to 1878, including 11 elephants and mastodons, 7 rhinoceroses, and 6 giraffes or their allies, such as the huge *Sivatherium*. Two or three additional species of mammals have since been added.

The whole of this fauna is still assigned to the miocene period by many European palæontologists, and in the anniversary address of the President, Prof. Martin Duncan, to the Geological Society of London for 1878, the miocene age of the Siwalik fauna was advocated in very strong terms. The views held by those members of the Indian Survey who have written on the subject and have advocated a pliocene age for the Siwalik fauna were I think, rather underrated, and this is the more to be regretted, as several of the data quoted as adverse to those views are incorrect. Had the case really been as Professor Martin Duncan puts it, the Indian Surveyors would deserve to be ridiculed for bad reasoning, but I think it will be easy to shew that the arguments in favour of a pliocene age for the Siwalik fauna are much stronger than they are represented. I must refer all who wish to examine the argument more fully to Chapter XXIV of the 'Manual of the Geology of India,' but the principal facts are simple enough.

The Siwalik mammalian fauna consists of 21 extinct genera, comprising 80 species, and 24 living genera, represented by 53 species. Of the extinct genera, 10 are peculiar to the Indian tertiaries, 4 are only known to occur in Europe in miocene beds, whilst 7 are both miocene and pliocene; of the recent genera, 8 range back as far as the upper miocene in Europe, 10 are not known in older beds than pliocene, and 6 have elsewhere only occurred living or in post-pliocene deposits. Several mammalia are very closely allied to existing species.

Of six Siwalik reptiles sufficiently known to be fairly comparable, three are common living species now inhabiting the same area. All the land and freshwater mollusca found, so far as they can be identified, are recent species. The whole facies of the fauna, including *Mammalia*, *Reptilia* and *Mollusca* is decidedly more recent than miocene. All the reptilia and most of the mollusca found in the miocenes of Europe are extinct forms, and the proportion of extinct mammalian genera is usually greater than in the Siwaliks, though there are exceptions.

The palæontological data are confirmed by the geological. The Siwalik fauna is entirely derived from middle and upper Siwalik beds, the lower Siwalik or Náhan being unfossiliferous in the typical Sub-Himalayan locality. But in Sind some beds called Manchhar occur, corresponding to the Siwaliks, and in the lowest of these strata, there are found, together with some Siwalik species, remains of extinct genera not detected in the upper or middle Siwaliks, and in some cases characteristic of the miocene epoch. Amongst these genera are *Dinotherium*, *Anthracotherium*, *Hyopotamus* and *Hyotherium*. The lower Manchhar beds pass down into a group of marine strata, called Gáj beds, containing miocene (and apparently upper miocene) marine fossils. The age of the lower Manchhars cannot therefore be older than upper miocene, and as the Siwaliks contain a later fauna, and appear to be distinctly higher in the series, they must be pliocene. The Nerbudda ossiferous gravels, containing human implements similar in form to those found in the post-tertiary beds of Europe, are universally admitted to be of later date than the Siwaliks, and must consequently be classed as post-pliocene. In the address to which I have alluded Prof. Martin Duncan notices the difficulty of finding a place for the newer gravels in the Deccan, from which *Rhinoceros deccanensis* was obtained. This is on the assumption that these Deccan gravels are of later date than those of the Nerbudda, but there is no reason for believing that the two differ in age.

At the same time it is only right to add that the alliances between the Siwalik fauna and the European miocene are very marked, and that a few Siwalik forms, such as *Chalicotherium*, indicate even more ancient relations. Moreover some beds at Pikermi in Greece contain a fauna having

several points of resemblance to the Siwalik, and amongst the Pikermi mammals are several characteristic species occurring also in the miocene beds of Central Europe. The Pikermi fauna is consequently commonly quoted as upper miocene, both by geologists and naturalists. Now the Pikermi beds have been admirably described by M. Gaudry in a work entitled "*Animaux fossiles et geologie de l'Attique*," in which it is shewn that, at the base of the ossiferous gravels, there is a layer containing pliocene marine fossils, and that all these beds rest unconformably on lacustrine miocene rocks. The age of the latter, it is true, depends on plants, but the pliocene marine fossils of the Mediterranean area are too well known for a mistake to be possible as to their relations. The reasonable conclusion appears to be that the Pikermi mammals are pliocene also, and that some species survived to a later period in Greece than in Central Europe. It is highly probable that the miocene affinities of the Siwalik fauna are due to a similar migration to the southward of the animals which in the warmer miocene period inhabited central and northern Europe and Asia. Such a migration may have been facilitated by the circumstance that the Himalayas up to pliocene times were of small elevation, even if they formed a range of mountains, for it has been shewn that all the disturbance of the north-western Himalayas is of post-eocene date and much is post-pliocene. A similar migration to the southward is perhaps indicated by the presence of miocene plants in Greenland, and the possibility, as explained by Mr. Gardner, that the beds containing these plants are really of eocene age. If the suggestion made by Wallace in his "*Geographical Distribution of Animals*" be correct, and the astonishing difference in the abundance of large animals in the later tertiary periods and at the present day be due to the extermination of the greater portion in the glacial epoch, it is evident that the refrigeration of the earth, known to have commenced as early as miocene times, had for its first effect the migration of many forms to the southward.

Before quitting the subject of Indian Palæontology, I am very glad to be able to announce an act of liberality on the part of the Government of India. It has been determined to engage Dr. Waagen's services for the description of Indian fossils, and thus to enable him to proceed regularly with the large collections from the Salt Range and other places. I am also happy to state that Professor Martin Duncan, who has described tertiary corals from so many parts of the world, has very kindly undertaken the examination of the large series of tertiary corals collected in Sind. We are also indebted to the same naturalist for having described some remarkable fossils from the Karákoram pass, occurring, apparently, in triassic beds, though Dr. Stoliczka's brief note does not state this so clearly as might be wished. These fossils are spherical with a

very peculiar structure, and have been alternately classed as corals, *Foraminifera*, and sponges, and even by one writer as Cystideans, a view which must have been derived from the examination of an imperfect drawing. It appears, according to Professor Martin Duncan's determination,\* that these singular "Karákoram stones" are examples of an entirely new class of *Protozoa*, distinct from sponges and *Foraminifera*, but most nearly allied to the latter, and chiefly distinguished by the absence of cells and by the much greater development of the tubular structure. For this new class of animals the name of *Syringosphæridæ* is proposed.

Finally I am glad to be able to announce the completion of the Manual of Indian Geology, on which Mr. Medlicott and I have been engaged for more than two years, and which will, I hope, render the study of Indian Geology in the future somewhat less laborious than it has hitherto been, and enable all who are interested to gain some knowledge, at all events, of the science, without going beyond the limits of a single work. I have the pleasure of laying before you this evening the bound copy of this work, complete, with the exception of the index, which is now being printed. It is a deplorable circumstance that the late Dr. Oldham, under whose superintendence the greater part of the survey has been carried out, and to whom so much of the labour is due that has rendered it possible to prepare anything like a connected account of Indian Geology, should not have lived to see the completion of the Manual.

In Biology, although, owing to the sad gaps left in our numbers by the losses of the last few years, and by the absence of some of the most energetic members of the Society in Europe, the contributions to the Journal of the Society have diminished, there is no decrease in the work done, and the smaller number of the papers published in our Journal is partly accounted for by the publication of such works as "Stray Feathers." At the same time, as the continuance of these works shews the growing interest in different branches of science in India, our Society cannot but benefit indirectly from the rivalry.

The most important botanical work at present in progress is of course the 'Flora Indica' published by Sir Joseph Hooker, with the assistance of several excellent botanists. Of this Flora one part was published during the year, bringing the work down to the natural order *Myrtaceæ*, and, as I learn from Dr. King, another is nearly ready, completing the second volume. A large amount of material for Vol. III, is ready or nearly so. To the staff engaged in the preparation of this hand-book, Mr. C. B. Clarke, one of the best Indian botanists, has been added, and it may confidently be hoped that

\* Ann. Mag. Nat. Hist., Octr. 1878, Ser. 4, Vol. II, p. 297.

many years will not elapse before a complete hand-book of the Flora of British India and its dependencies will be completed.

Kurz's 'Forest Flora of Burma,' the last work of its lamented author, although dated 1877, only appeared at the commencement of 1878. It consists of two octavo volumes, and contains descriptions of all the woody plants, *i. e.*, trees and shrubs, about 2000 in number, hitherto detected in British Burma. Any criticism of this work is of course beyond my power, but it is easy for any one to recognize the very great amount of labour expended on its production, and I am assured, by both forest officers and botanists, that it is a most valuable addition to the botanical literature of India.

In zoology the field is so wide, and the observations so scattered, that it is difficult to select the particular points of importance. One of the most important works published during the past year is the British Museum Catalogue of *Chiroptera*, written by one of our members and a frequent contributor to our Journal, Mr. G. E. Dobson. The descriptions of Asiatic bats are copied from the author's Monograph of Asiatic *Chiroptera*, published by the Trustees of the Indian Museum two years ago. The effect of Mr. Dobson's studies of bats has been simply to render the mammalian order of which, previously, the least information existed, one of the best known amongst the smaller and more obscure sub-divisions of the class, and to place the study of the *Chiroptera*, at all events so far as generic and specific distinctions and geographical distribution are concerned, considerably in advance of such orders as *Rodentia* and *Insectivora*. The number of species of bats known to exist is 400: of these no less than 122 are Asiatic, and as the species in tropical and subtropical climates vastly exceed in number those found in temperate countries, it is not surprising to learn that, of these 122, a large proportion are found in some part of the territories belonging to British India, no less than 69 species being enumerated within these limits. In Dr. Jerdon's Mammals of India, published in 1869, the number of species of bats noticed was 55, not including purely Burmese forms. This, however, conveys an inaccurate idea of the additions made by Dr. Dobson, for many of the supposed species noted by Dr. Jerdon were merely varieties, differing in colouration alone.

Birds have, as usual, attracted far more attention than any other class of animals, vertebrate or invertebrate, and foremost amongst the publications devoted to them must be placed Mr. Hume's Journal of Ornithology for India and its dependencies, which continues to appear, under the title of 'Stray Feathers.' By far the greater portion of this periodical is from the pen of its proprietor and editor, and it is difficult to over-estimate the energy and hard labour by which alone a work of this kind can be published



by one busily engaged in official duties. Collections on the scale of Mr. Hume's have never been made in India before, in any branch of the animal kingdom, and much time and care are devoted to the determination and description of the large series of skins collected. Indeed Mr. Hume may fairly claim to have founded a school of ornithology in India, and the great attention now given to one of the most interesting classes in the animal kingdom, by training observers, has no small effect in leading to a study of other branches of zoology, less attractive perhaps at first, but of equal scientific importance.

Of 'Stray Feathers', one whole volume and part of a second have appeared during the past year, or more than has ever previously been published within the same period. The completed volume is entirely filled with a list of the Birds of Tenasserim, and is, in all respects, a great addition to our knowledge of one of the richest, though hitherto the least known, of the territories belonging to the Indian Government, and a country of singular zoological interest for two reasons, firstly, because few tracts on the earth's surface have been less changed by the hand of man, and secondly, because within the limits of the province there is one of those dividing lines between the faunas of different zoological subregions or provinces, the investigation of which is so essential in order to determine the history and causes of geographical distribution. The value of Mr. Hume's work may be partly inferred from the circumstance that his assistant and coadjutor Mr. Davison has collected no less than between 8000 and 9000 specimens of birds in the Tenasserim provinces, and that these and about 500 specimens received from other collectors represent 580 species out of the 669 believed, on good authority, to occur within the province. Mr. Blyth's list of the birds of all Burma, published in the Society's Journal for 1875, contained but 660 species, and of these at least 100 have been found in Pegu or Arakan, but not in Tenasserim, whilst 41 are said by Mr. Hume to be either not Burmese or else not distinct specific forms, so that fully 150 birds have been added to the avifauna of Tenasserim, (and, in most cases, this implies an addition to the avifauna of British India and Burma,) in the short space of three years. It is scarcely necessary to say that a large proportion of the additions are Malay species now detected for the first time in Southern Tenasserim. The whole bird fauna of British India and its dependencies, inclusive of Ceylon and Burma, as now known, comprises, according to Mr. Hume's estimate, about 1700 well authenticated species,\* whilst only 1008

\* Mr. Hume informs me that the number of species, roughly calculated, is 1793; of these probably about 93 are sub-species or varieties or of doubtful occurrence within the limits. If the neighbouring countries, as the Laccadives, Baluchistan, Afghanistan, Wakhan, Upper Burma, and the western half of the Malay Peninsula with Malacca,

were enumerated in Dr. Jerdon's Birds of India, the Assamese, Burmese and Ceylonese forms not being included.

Besides the volume on the Birds of Tenasserim, a goodly fasciculus of 172 pages has appeared, devoted to various Indian Ornithological subjects. Probably the most valuable paper is "a second list of the birds of Southern Travancore," a region quite as interesting as Tenasserim, and until recently equally neglected, as least so far as its birds were concerned. Some important additions too are made to the avi-fauna of the desert country in Western India, although it is to be hoped that such species as *Rusticilla mesoleuca* and *Lanius auriculatus* will not be included in the Birds of India until their occurrence within the limits has been verified on unquestionable evidence.

Captain Legge's 'History of the Birds of Ceylon' is a most important work, of which one quarto part containing 347 pages has already appeared. I am indebted to Mr. Hume for an opportunity of seeing an early copy of this part, the only copy, I believe, that has reached India, and I can only endorse his opinion that it is the best work of the kind devoted to Indian Zoology that has appeared. Carefully and systematically arranged, very much on the model of Dresser's 'Birds of Europe,' containing ample descriptions of plumage, habits, distribution, and nidification, it is still free from excessive discursiveness, and the plates, in which most of the species peculiar to Ceylon are represented, are excellent. The present part contains the *Accipitres*, *Psittaci* and *Picariæ*.

It is almost too soon to hope for a similar book on the birds of all India. Should such a work be produced, there are, I would suggest, two slight additions that would greatly increase its value in the hands of students. One of these is a key to the genera and species, the other the addition of lithographs or woodcuts giving details of characteristic parts, such as the bills, feet and primaries.

As ornithology appears to be the favourite zoological study of so many Anglo-Indians, it is impossible to avoid regretting the conservatism shewn in one respect by the leaders of the science in India. It is not surprising that Jerdon's 'Birds of India' should be a favourite book, for but few works on birds possess higher merits, and it is unquestionable that the existence of this book has aided greatly in fostering a taste for ornithology. But the classification adopted by Jerdon was antiquated and obsolete, even when his book was published, and very important advances have been made in our knowledge of the affinities of the various families since it appeared, so that at the present day there is really no excuse for such absurdities as the Penang and Singapore, all countries more or less under British protection, be added the number will be raised to 2000.



retention of gulls and ducks together in one order, and plovers with herons and storks in another. If there is any one point clearly made out, it is that gulls are far more closely allied to plovers than to ducks. This is, of course, only one instance out of several: the classification of swifts and goat-suckers beside swallows, of *Eurylaimidæ* beside hornbills, and of parrots next to wood-peckers are gross violations of natural affinity. Yet whilst almost everything else has been changed; whilst the nomenclature of a large proportion of the birds has been altered, a mass of additional information added as to range, habits and nidification; whilst the very limits of the country classed as British India have been so greatly extended as to change entirely the geographical range of the fauna, the worst feature of Jerdon's work, the classification, has been so religiously maintained that even the numbers given by him to the species enumerated are carefully quoted, and the numerous additional species inserted after their nearest allies. It is scarcely necessary to say that these remarks do not apply to Captain Legge's work on Ceylon birds, the arrangement of which, so far as it has gone, is consistent with our present knowledge of the class. We are, however, promised a most useful work on the Game Birds of India, including, it may be presumed, the *Anseres*, *Columbæ*, *Gallinæ*, *Fulicariæ*, *Alectorides*, and *Limicolæ* of Mr. Sclater's classification, but which would consist of broken fragments of orders under the old system. It is to be hoped that in this, which is very likely to be the first book on zoology studied by many future ornithologists, the classification will not be such as grievously to mislead every tyro who uses the work.

It is impossible to write of Indian ornithology without deploring the loss it has sustained in the death of the Marquis of Tweeddale, for many years past one of our first authorities on all subjects connected with the Avi-fauna of the Oriental region, who died at the close of the year after a few days' illness. To many of the working ornithologists of India, and especially to those who are carrying on the study in England, the loss will be irreparable, the more so as Lord Tweeddale was engaged upon a new edition of Jerdon's 'Birds of India.' Unquestionably such a work, compiled with the advantage of access to the libraries and collections of Europe, would have remedied the defects almost inseparable from the preparation of a similar monograph with only the means available in this country.

There is but little novelty to record in *Reptilia* or *Amphibia*. Colonel Beddome continues his discoveries amongst the wonderfully rich fauna of the Malabar hills, and some curious forms of lizards, snakes and frogs have been described by him. Some interesting forms have also been obtained by Mr. Davison in Tenasserim, and described in the Society's Journal, and a new snake has been captured in Sikkim, one of the last places from which a novelty could have been expected.

Dr. F. Day's work on the Fishes of India has been much delayed by the death of Mr. Ford, the artist, to whom the plates had been entrusted for preparation, and hitherto but one volume has appeared, containing the first 22 families of *Acanthopterygii*. Both descriptions and plates appear to be all that can be desired. It is to be hoped that, for the advantage of local students, who will have some difficulty at first in understanding the descriptions, a complete explanation of all scientific terms used may be appended, but the abundance of figures should render it easy to recognize the various forms. To the volume there are no less than 68 plates, exquisitely drawn, each representing on an average about 6 species.

When Dr. Day's work on the Indian fishes is concluded, we shall possess hand-books of all the vertebrate classes; Jerdon's Mammals and Birds, Günther's Reptiles and *Amphibia*, Theobald's on Reptiles alone and Day's on Fishes. But with the exception of the last, all these works are more or less imperfect, and require considerable additions in order to bring them up to the present state of our knowledge. The most imperfect of all is perhaps that on the *Amphibia*, the number of which, known to inhabit British India and its dependencies, has been greatly increased since Dr. Günther's work was produced. Large and expensive illustrated works are not so much needed as books on the model of Jerdon's, of such size as to be easily carried, and containing sufficient descriptions to enable any one with a little study to identify the animals he meets with.

But much as hand-books of Indian *Vertebrata* are wanted, there is a far greater need of similar aids to the study of the *Invertebrata*. In the course of the last few years a beautifully illustrated work on land and fresh-water shells, the "Conchologia Indica" of Hanley and Theobald, has been published, but I know of no other monograph of any large group of Indian invertebrates. The number of students would be greatly increased were the means of identifying the animals greater, and even from a practical point of view, the only view in which, I regret to say, the majority of the world is capable of sympathizing, much good might be done. For instance, the injury done yearly by insects to the crops of India is something enormous, without considering the mischief inflicted by our various six-footed rivals and enemies in other ways. Yet we scarcely know which kinds of insects are to be guarded against, nor what are their natural enemies, and any one desirous of ascertaining the species and of learning what is known about their habits must search through an extensive library in order to gain the information required.

In time much aid in the preparation of books on Indian natural history may be anticipated from the officers of the Indian Museum. The only work hitherto commenced on any portion of the invertebrate collection, Mr.

Nevill's 'Hand-list of Mollusca,' is little more than an enumeration of the specimens in the Museum. This by itself is extremely useful, and would be easily rendered more so by a reference to a description and figure in the case of each species, but it is a matter for regret that the labour spent in determining so many foreign land Mollusca, all comparatively well known, and perhaps better monographed than almost any other section of invertebrata, should not have been devoted instead to the preparation of a work on the marine Mollusca of the Indian seas.

One small fasciculus, containing three families of freshwater *Gasteropoda*, the *Ampullaridæ*, *Valvatidæ* and *Paludinidæ* was issued in 1877. This part contained numerous references, and many excellent critical remarks, but in the much larger part printed last year the remarks are comparatively much fewer, and scarcely any references are given. This, it is true, is not of much importance, since the Indian land-shells are mostly figured in the 'Conchologia Indica', and all can be found in Pfeiffer's monographs, both of which works are, of course, well known to every naturalist who pays more than a passing attention to the subject, but it may fairly be hoped that any future fasciculi containing lists of marine Mollusca will be rendered more useful to students by the addition of references, if not of descriptions. It is also, I think, unfortunate that Mr. Nevill should have adopted the classification of Carus and Gaerstecker, as it is, I believe, in error in classing together the *Helicinidæ*, *Cyclostomidæ* and *Cyclotidæ* in one suborder *Neurobranchia*, a suborder founded on the old false system of neglecting all the details of structure except the characters of one prominent organ. The breathing organ is selected in this particular instance, although its variability in some families of Prosobranchiate *Gasteropoda*, such as the *Littorinidæ* and *Cerithiidæ*, is notorious, and the close resemblance of these groups to some of the so-called *Neurobranchia* is manifest. It is true that Mr. Nevill has the majority of European conchologists with him, but very few of these have had the same advantage of becoming acquainted with the animals of operculated land-shells that Indian observers possess. If the *Cyclophoridæ* belong to a suborder of *Gasteropoda* distinct from that comprising *Littorinidæ*, and if the distinction of the supposed suborder *Neurobranchia* be founded on the absence of gills, why is not *Assiminea* removed from the *Rissoidæ* (as is done by von Martens) and *Cerithidea obtusa*\* from the *Cerithiidæ*, and both classed with the other air-breathing *Gasteropoda*?

Another cause for regret, due I believe also to the evil example of Messrs. Carus and Gaerstecker, is the want of uniformity in the termi-

\* See Stoliczka P. A. S. B., 1869, p. 187, and 1871, p. 114. Dr. Stoliczka's most valuable observations appear to have been much overlooked by Malacologists.

nology used for names of families and subfamilies. In this matter it may be hoped in future that the British Association rules will be followed, and the terminations *idæ* and *inæ* employed, as they are by almost all English zoologists. It is confusing to find *Ampullariacea* and *Paludinidæ*, *Helicidæ* and *Auriculacea*, *Aciculidæ*, *Pomatiacea*, *Helicinacea*, &c., as families and *Onchidiidæ*, *Testacellidæ*, *Limacea*, *Philomycidæ*, *Arionidæ*, *Helicea*, *Vaginulidæ*, *Orthalicea*, *Succineacea*, *Otinea*, *Melampea* &c., *Cyclotina*, *Cyclophorina*, &c., *Pupinea*, *Cyclostomina* and *Realica* as subfamilies.

The value of Mr. Nevill's catalogue consists in the large number of authentic localities, and in the care which has been given to the generic and sub-generic classification of that most difficult family the *Helicidæ*. To a few details, such as the position assigned to *Camptonyx* and to the sub-genus *Thysonota*, I should be disposed to take exception, but I believe the greater part of the classification is sound. As a rule too, though not so often as would be desired, in each locality, the name of the province or district is given after that of obscure villages, streams or hills, a most important matter constantly neglected by compilers of catalogues, and which should be invariably attended to.

The promised description by Mr. Moore of the new species in the late Mr. W. S. Atkinson's large collection of Indian *Lepidoptera* will, it may be hoped, be in the hands of members of this Society before long. Meantime it is satisfactory to see that numerous descriptions of Indian butterflies and moths from the collections of Mr. Atkinson, Capt. Beavan, Col. Godwin-Austen and others have appeared within the past year in the Proceedings of the Zoological Society. In the same Journal for the preceding year Mr. F. Moore gave a complete list of the known *Lepidoptera* of the Andaman and Nicobar Islands, together with a table shewing the geographical distribution of each species, a most important addition. Mr. Wood-Mason has continued his notices of certain orthopterous forms in the same periodical and elsewhere.

During the past year, the arrangements for the description of the very varied collections made by the late Dr. Stoliczka in the Punjab hills, Káshmir, Ladák, the Kuenlun, Eastern Turkestan, the Pámir, Wakhán &c., when accompanying the mission sent by the Government to Yárkand and Káshghar in 1873-74, have been completed by Mr. Wood-Mason, and a commencement of printing the various reports has been made. The following is a list of the naturalists engaged in working out the different groups of *invertebrata*.

|                           |                                                      |
|---------------------------|------------------------------------------------------|
| <i>Mollusca</i> ,.....    | Mr. G. Nevill.                                       |
| <i>Coleoptera</i> , ..... | Messrs. D. Sharp, H. W. Bates and<br>Dr. J. S. Baly. |

|                            |                       |
|----------------------------|-----------------------|
| <i>Hymenoptera</i> , ..... | Mr. F. Smith.         |
| <i>Lepidoptera</i> , ..... | Mr. F. Moore.         |
| <i>Neuroptera</i> , .....  | Mr R. McLachlan.      |
| <i>Rhynchota</i> , .....   | Mr. W. L. Distant.    |
| Spiders, .....             | Rev. O. P. Cambridge. |
| <i>Crustacea</i> , }       | Mr. J. Wood-Mason.    |
| <i>Orthoptera</i> , }      |                       |

The birds have been worked out by Mr. Hume, the fishes by Dr. F. Day, and the mammalia (except the bats, which Mr. Dobson has examined) and reptiles by myself. I have also compiled the geological portion of the work, and I have already noticed that some very interesting fossils will be described by Professor Martin Duncan. The parts containing the fishes, *Reptilia* and *Amphibia*, *Mollusca*, *Neuroptera*, *Hymenoptera* and Geology are now ready for issue, and those on Spiders and Mammalia are in the press. With so much able assistance, it may be hoped that we shall succeed in producing a worthy memorial of our late friend Dr. Stoliczka.

The archæological literature of India has been enriched by the publication of two Volumes, VII and VIII, of Reports from the Archæological Survey of India. Both these volumes are by Mr. Beglar. Of the "Indian Antiquary," certainly one of the most admirably edited periodicals ever published in India, parts have appeared monthly. The names of the writers in this Journal are sufficient to shew the value of the contributions, and it is manifest that the cessation from existence of those scientific periodicals in India that have attained Nirvana is due to other causes than want of raw material.

Few subjects of enquiry in India have made so rapid an advance in the course of the last few years as Meteorology. The establishment, first of provincial reporters, and then of a central office for the whole of India, has been succeeded in the last twelve months by a plan of telegraphic reporting. From the commencement of the monsoon in 1878, reports have been received once daily by telegraph from 3 stations in Assam, 10 in Bengal, 3 in Burma, 8 in the North-West Provinces, 7 in the Punjab, 8 in Bombay and Berar, 3 in the Central Provinces, 6 in Madras and 1 in Ceylon, or 49 in all. These reports give readings of the barometer, wet and dry bulb thermometers, the wind direction and amount of cloud, all observed at 10 A. M., and the rainfall in the preceding 24 hours, together with remarks on the weather. The returns of each morning are received during the day at the head quarters of the Government, either at Simla or Calcutta, and printed off, with remarks, in time to be issued early on the following morn-

ing. In the remarks all the principal features of pressure, wind, rainfall &c., during the preceding 24 hours are noticed. The Government of India has now sanctioned the continuance of this system permanently, and has authorized the publication, with the daily reports, of lithographed weather charts for India, similar to those published for some years past in the United States and several European countries. This improvement will come into operation shortly.

It is very satisfactory to find that the vast practical importance of extended meteorological observations, and of quick and accurate information, has been so rapidly recognized throughout India as has been the case, and that the great advantage to commerce and agriculture to be derived from a careful study of the changes in the atmosphere has been appreciated, if not to the extent that it deserves, still sufficiently to convince thinking men. The time may come when a meteorological report will have to be posted at every thannah in the empire in order to warn farmers when to expect rain or fine weather for their crops, and there can be no reasonable doubt that either a continuance of dry weather or heavy rainfalls could, in India, as a general rule, be foretold several days beforehand even now. Just as the storms of Western Europe are outstripped by the telegraph in their race from the American coasts to the shores of Great Britain, so the singular cyclonic movements to which, as Mr. H. F. Blanford has shewn, the heavy rainfall of the year is mostly due, are now predicted in Northern India before the atmospheric disturbance itself has travelled beyond the shores of the Bay of Bengal.

The publication of the '*Indian Meteorologist's Vade-Mecum*' by Mr. H. F. Blanford in 1877 has furnished a record of the present state of Indian Meteorology. The work consists of two parts, the first containing Instructions to Observers, with a description of different meteorological instruments, instructions as to their use, and of the precautions to be taken in observing them, and rules for the reductions necessary. The second part of the work consists of a description of the meteorology of India, and comprises chapters on the physical properties of air and vapour, the Physical Geography of India and its dependencies, Radiation and Temperature, Atmospheric pressure and Winds, Hygrometry, Cloud and Rainfall, Storms, and suggestions for future enquiry. At the end of the work are tables of annual and monthly mean barometric pressure, temperature, rainfall, &c., and an accompanying volume gives the necessary tables for the reduction of observations. The work is intended to be a Manual or Hand-book of Meteorology for India, and whilst shewing how much has been ascertained in the course of the last few years, it will serve as a mark from which to measure future progress.



During the past year besides the Annual 'Reports on the Meteorology of India' for 1876, by Mr. H. F. Blanford, a large quarto work on the Meteorology of the Bombay Presidency, accompanied by a portfolio of beautifully engraved maps and diagrams, has been published in London by Mr. Charles Chambers, F. R. S., Principal of the Bombay Observatory. In this work a summary of the results derived from the observatory at Bombay since 1841, and especially from 1860, and for the last 17 years at Karáchi, Dísa, Púna and Belgaum, is supplemented by observations made at other stations. A second number of Indian Meteorological Memoirs has also been published in Calcutta, containing papers "on storms in Bengal with increased atmospheric pressure" by Mr. Eliot; "on the rainfall of Benares" by Mr. Hill; and "on the diurnal variation in the barometer at Calcutta and Hazáribágh" by Mr. H. F. Blanford.

The investigation of cyclonic storms has always been one of the first duties of the Indian Meteorological Department, and has become doubly important now when so large a portion of the rainfall has been shewn to depend on the same laws as the destructive gales of the Bay of Bengal. Mr. Eliot's masterly report on the Vizagapatam and Backergunge Cyclones of October 1876 was published in 1877, and was a most important addition to previous knowledge. The Backergunge Cyclone is probably the most destructive of which any accurate information has been recorded, for it caused the death of more than 100,000 human beings, but it furnished rather more data than usual for an examination of the meteorological phenomena which preceded and accompanied it. The result of the examination of these two cyclones was distinctly in favor of Mr. H. F. Blanford's local depression theory of the causes of cyclones.

I now learn from Mr. Eliot, who has officiated as Meteorological Reporter for the greater part of the past year, that an investigation of some of the recent cyclones has not only apparently confirmed the views held by Mr. H. F. Blanford and himself as to the origin of cyclonic storms, but has also shewn that the paths of the intense cyclones of May and October follow the lines (approximately if not exactly) of least relative atmospheric motion before the generation of the cyclone. The views referred to as to the origin of cyclones will be found described at length at p. 250 of the "Meteorologist's Vade-Mecum," already referred to, where it is shewn that the antecedent conditions are calm weather over the sea, with a barometric pressure equal or nearly equal around the coasts. Under these circumstances a large quantity of vapour is produced by the solar heat, and this vapour being unable to escape is again condensed and liberates a great amount of latent heat over the place of its production; the replacement of cooler by warmer air induces a local diminution of atmospheric pressure, and this causes a

violent indraught of air. In this indraught, cyclonic circulation is caused by the earth's rotation, according to known laws. Mr. Eliot has now determined that in all probability the path of the cyclone is due to the same antecedent causes as the origin of the cyclonic movement.

But little reflection is needed in order to show the importance of these conclusions as to the laws which govern the origin and cause of cyclones. It simply means that, with a few additional opportunities of observation, such as telegraphic communication with the Andaman and Nicobar islands would afford, it would be possible, if the theories are correct, not only to tell when cyclones may be expected and when they cannot occur, but to trace out the approximate course they must follow when formed, and to give warning to threatened portions of the coast days in advance instead of hours. The importance of this for the protection of the shipping is easy to understand. But the injury done by these terrible gales to the shipping, fearful as it is, is really small compared with the destruction of life and property on shore; it is probable that more lives were lost, and more property destroyed by the Backergunge Cyclone on land in a few hours, than by all the cyclones of the Bay of Bengal at sea in the course of the last century. It is not probable that the dangers of tropical gales can be averted, but much may be done to diminish the destruction of life and property by timely warning, and this can only be given if the course of the storm can be foreseen. This most important object appears now within our reach.

The progress of Indian Meteorology cannot but be satisfactory to the Asiatic Society, for it was in no small degree owing to the representations made to the Government of India by a Committee of the Society that the Meteorological Department, which has already achieved such important results, was established.

Although the above is so far from an exhaustive account of scientific work in India during the year 1878, that I fear, except in geology and in some branches of zoology, it gives a most imperfect idea of what has been done, I trust it will serve to shew how much labour is being expended in India upon scientific enquiry of various kinds. Time does not serve me to attempt a review of all that is being done in other parts of Asia. There are, however, two works published during the year, each a record of scientific travel, and each deserving of notice. One is the account of Colonel Prejevalski's journey to Lob-nor and the Altyn Tag, a range of mountains previously unknown, lying south of Lob-nor and forming the northern scarp of a plateau apparently connected with that of Tibet. The other is the first volume of Baron F. v. Richtofen's 'China,' containing a mass of



information as to that country, and especially as to portions of it previously very imperfectly known. Indeed there can be no question that this work, the results of its author's long residence and extensive travels in the interior of the Chinese Empire, will be for a long time to come the great authority on the Celestial Kingdom. The present volume contains, amongst other matters, full details of v. Richtofen's investigations of the loess-like deposits of China, deposits which he attributes to deposition from dust transported by the atmosphere. To the same origin Dr. E. Tietze has attributed the deposits in the upland plains of Persia, and it is not unlikely that he may be correct in so doing, although I myself thought these formations due to a different mode of deposition.

I had hoped in this address to enter upon at least one other subject, the distribution of the fauna of India, and to have reviewed the present state of our knowledge on the question. I had collected for this purpose some notes relating to the connection between India and some of the other zoological regions into which the earth's surface is divided, but the time at my disposal has not been sufficient to enable me to treat the subject as thoroughly as I could desire, and I must therefore postpone all remarks upon it for another opportunity.

The President added—In conclusion I have to propose a vote of thanks to the Honorary Secretaries for their labours on behalf of the Society. The amount of work, and hard work, done by them at all times is so large as to merit our hearty acknowledgements, and during the past two years, in consequence, in the first place, of the alterations in the Society's house, secondly of the absence of the Natural History Secretary, who has for so many years edited Part II of the Journal, and thirdly of the resignation of the Assistant Secretary and his replacement by another, there has been more to do than usual, and by far the greater portion of this additional work has been done, and, I am sure you will agree with me, very well done by Captain Waterhouse, who has now filled the office of General Secretary for the long period of  $6\frac{1}{2}$  years. We are also greatly indebted to several other gentlemen ;—to Mr. Medlicott, who undertook the duties of General Secretary for four months, during Captain Waterhouse's absence from Calcutta ; to Mr. Tawney, who very obligingly carried on the work of Philological Secretary, when the sudden death of Mr. Blochmann deprived us of his invaluable services, and to Dr. Hoernle, who has now accepted the Secretaryship ; to Mr. Gay, who was Treasurer until his departure from Calcutta in July, and to Mr. Beverley who has taken charge of our finances since. All of these gentlemen have given a large proportion of time, care and attention to the Society's business, and we are greatly indebted to all

for their aid. I think too the Society is to be congratulated upon the circumstance that so many members, all of them hardworked officers of Government, or of Educational Institutions, have offered to undertake onerous labour, when, owing to the sad loss we have experienced by the death of Mr. Blochmann, and in consequence of the absence of some of our most hard-working members, there has been an unusual amount of difficulty in providing for the current work of the Society. At the same time we have the more reason to be grateful to those upon whose exertions the progress and even the existence of the Society so largely depend, and I think the least we can do is to thank our Honorary Secretaries for the valuable work they have performed for us, and for the time and care they have devoted to our affairs.

The vote was carried unanimously.

The PRESIDENT announced that the Scrutineers reported the result of the elections of Officers and Council as follows :

W. T. Blanford, Esq., F. R. S.

*President.*

Dr. Rájendralála Mitra, Rai Bahádur, C. I. E.

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Capt. J. Waterhouse, B. S. C.

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J. Anderson, Esq., M. D., F. C. S.

C. H. Tawney, Esq., M. A.

Rev. A. F. R. Hoernle, PH. D.

H. Beverley, Esq., C. S.

H. F. Blanford, Esq.

} *Members of Council.*

Messrs. J. Westland and R. Lydekker were appointed to audit the annual accounts.

The Meeting was then resolved into the Ordinary Monthly General Meeting.

W. T. Blanford, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From Dr. Rájendralála Mitra, Rai Bahádur, C. I. E., Facsimiles of Inscriptions and Maps, described in his work on Budha Gya.

2. From M. L. Dames, Esq., Blœw's *Geographie Universelle*, 1637, 12 Vols.

3. From T. W. H. Tolbort, Esq., Ra-binsau Kruso.

4. From Bábu Adharlal Sen, B. A., Lalita Sundari and Kabitabuli.

5. From Rájá Ráma Vera, Prayaschitta bhága, 2 parts, 4 Nos.

6. From Bábu Damodara Sastri, Vidyarthi, 6 Nos.

7. From R. Sewell, Esq., M. C. S., copy of his report to Government on Antiquarian explorations and researches in the Kistna District.

8. From L. Schwendler, Esq., copy of *Précis of Report on Electric Light Experiments*.

The following gentlemen, duly proposed and seconded at the last meeting, were ballotted for and elected Ordinary Members—

Lieut. C. R. MacGregor. Major J. Sconce. J. F. Duthie, Esq.

The following are for ballot at the next meeting—

C. E. Buckland, Esq., C. S., proposed by T. W. Gribble, Esq., C. S., seconded by Capt. J. Waterhouse.

M. van Eetvelde, Consul General for Belgium, proposed by W. T. Blanford, Esq., seconded by Capt. J. Waterhouse.

E. O'Brien, Esq., C. S., Settlement Officer, Mozuffergarh, proposed by Carr Stephen, Esq., seconded by Capt. J. Waterhouse.

Major J. Biddulph, B. S. C., on special duty, Gilgit, Kashmir, proposed by Dr. J. Scully, seconded by Capt. J. Waterhouse.

A. Levinge, Esq., C. S., Joint Secretary to Government of Bengal, D. P. W., proposed by W. T. Blanford, Esq., seconded by A. W. Croft, Esq.

A. W. Garrett, Esq., M. A., Inspector of Schools, Presidency Circle, proposed by A. W. Croft, Esq., seconded by W. T. Blanford, Esq.

Major H. S. Jarrett, B. S. C., Secretary to the Board of Examiners, Fort William, proposed by Capt. J. Waterhouse, seconded by C. H. Tawney, Esq.

S. Harraden, Esq., Calcutta, proposed by W. T. Blanford, Esq., seconded by Capt. J. Waterhouse.

Capt. G. J. Van Someren, Forest Department, proposed by Major-Genl. J. T. Walker, R. E., C. B., seconded by Capt. J. Waterhouse.

Major J. Herschel, Survey of India, proposed by Major-Genl. J. T. Walker, R. E., C. B., seconded by Capt. J. Waterhouse.

A. Weekes, Esq., C. S., Collector of Champaran, proposed by the Hon. J. O'Kinealy, seconded by W. T. Blanford, Esq.

R. Pawsey, Esq., C. S., Collector of Champaran, proposed by the Hon. J. O'Kinealy, seconded by W. T. Blanford, Esq.

The SECRETARY exhibited some gold and silver coins received from Mr. H. Rivett-Carnac, C. I. E., and read the following note regarding them.

Mr. Rivett-Carnac says :

I submit for the inspection of the Society, three Hindu and three Muhammadan coins.

Of the Hindu coins, two are gold, and one silver. They are of the class termed '*Sítárámi*' by the villagers, the idea being that the female figure represented *Sítá*, the male (?) figure on the obverse *Rám*.

They are supposed to weigh seven *másas* each, and each to be worth seven Rupees, the village rhyme running—

|                      |                               |
|----------------------|-------------------------------|
| Sáth Masa,           | Seven <i>másas</i> in weight, |
| Sáth dám,            | Seven Rupees in value,        |
| Ek war <i>Síta</i> , | On one side <i>Sítá</i> ,     |
| Ek war <i>Rám</i> ,  | On the other <i>Rám</i> .     |

They are obviously of the type figured in Thomas' "Prinsep," Plates XXIX, XXX. But it is not impossible that the legends may be different from those of coins in the possession of the Society, and I am encouraged by the interest taken in the *Sáh* (?) coin recently submitted through Dr. Rájendralála Mitra, C. I. E., to forward these also for inspection.

I would enquire whether *silver* coins of the Kanauj series are common? I have several gold ones, but this is the first *silver* "*Sítárámi*" I have seen, and Prinsep has, I think, generally figured *gold* coins of this series.

As regards the Muhammadan coins, I cannot trace them in Thomas or Marsden.

The gold coin is a *Fírúz Sháh*, but which *Fírúz*? And the two silver coins, are they common, or known?

The gold coin seems to be the same as No. 50, Plate II (silver coin of *Fírúz Sháh Jálál-uddin Khilji*).

But Thomas mentioned no *gold* coin of that king.

*Note by Dr. Rájendralála Mitra.*

No. 1. A silver coin of Chandra Gupta.

No. 2. A gold coin of Kumára Gupta, apparently a cast coin—a forgery.

No. 3. A debased coin of Kumára Gupta. The metal is gold alloyed with about  $\frac{1}{3}$  of copper. There are some coins in which the gold and copper are in equal proportions—billion. Some such were found in Jessore thirty years ago, and noticed by me in the Journal, Vol. XXI, p. 401.

No 4. A gold coin of Jalál-uddin Fírúz Sháh of Delhi—apparently the counterpart of the unique gold coin in the British Museum, noticed by Mr. Thomas in his “Pathan Coins,” page 144. The legend is the same as in the silver coin figured No. 50.

No. 5. A silver coin of Nuçrat Sháh, son of Husain Sháh of Bengal, figured by Mr. Blochmann in the Journal, Vol. XLII, plate IX, fig. 2.

No. 6. A silver coin of Ghiás-uddin Mahmúd Sháh, son of Husain Sháh of Bengal and brother of Nuçrat Sháh. A rare coin, figured by Mr. J. W. Laidlay, in the Journal, Vol. XV, plate V, fig. 23.

The SECRETARY read the following communication from Mr. H. Rivett-Carnac, C. I. E., on the subject of preservation of Archæological remains in India.

*Memorandum by H. RIVETT CARNAC, ESQ., C. I. E., M. R. A. S., F. S. A., &c. on administrative Rules for the protection of Indian Antiquarian remains.*

I submit for the consideration of the Society, whether it would not be advisable that the Supreme Government should be addressed, with a view to the issue of some simple administrative rules for the better protection of the Antiquarian remains of the various Provinces of India.

Recently when staying with Mr. Grant-Duff in England, I met Sir J. Lubbock, whose interest in such matters is well known, and on the subject being discussed, it was, I think, considered that some action was desirable. Mr. Grant-Duff, I understood, contemplated a representation being made to H. E. The Viceroy in favour of some such measure. But even if this has already been done, the subject is perhaps not undeserving of the attention of the Society.

The difficulties which Sir J. Lubbock's Bill for the United Kingdom has encountered are well known. But they are not likely to present themselves in the same form or in the same degree in India, where even legislative action will perhaps hardly be necessary, and where the district officers might, it is to be hoped, carry out without objection, the instructions approved by the Government.

I am not unmindful that the Government of India has, of late years, evinced considerable interest in the subject; that Archæology is one of the Departments under the Secretary to the Government of India for Revenue, Agriculture and Commerce; that Archæology also now forms a heading in the Administration Reports of all Governments and administrations; that

"*laths*" are not used now-a-days as rollers on metalled roads; that there is a prejudice against carved and inscribed stones being utilised as foundations for bridges and other building purposes; and that the Hon'ble Sir J. Strachey has recorded a very effective protest against the demolition of architectural remains for the manufacture of temporary triumphal arches. In the Central Provinces, of which I have some knowledge, the object has received much attention, and doubtless in many other parts of India of which I have no knowledge, the same good work is going on. The interesting archæological reports of General Cunningham shew that the examination of the antiquarian remains is progressing slowly but surely on a well-considered plan. And in the North-West Provinces, the action of Sir J. Strachey and the department created under his rule is doing much to ensure the preservation of interesting monuments, which another ten years of neglect might have placed beyond repair.

Still, with all this, it is desirable, I submit, that something more should be done to protect antiquarian treasures from demolition and spoliation. If it be held that heretofore the want of special measures has not been felt, it may fairly be answered that they are necessitated by the changes which India has undergone and is rapidly undergoing. The India of to-day is widely different from the India of Tod and of Prinsep. Those who are now employed in the country have less leisure for antiquarian enquiry than their predecessors. The official of 1879 has much of his time taken up with returns and reports, of which Tod knew nothing. The daily telegrams from Europe, the weekly mails from home loaded with cheap literature, enabling all who care to do so to keep pace with European thought, distract the attention from, and restrict the leisure available for, subjects of purely Indian interest. In old days, whatever of antiquarian value was discovered, was beyond the reach of the many, and either remained undistributed or was worked up for local publication. With rapid and cheap steam communication and the aid of guide-books, a new element has recently been introduced into the country. Now-a-days many of the most important places of antiquarian interest, are, comparatively speaking, easy of access, are marked on the maps and noticed in the guide-books, with which every tourist is provided. And there is now hardly a traveller with any pretensions to intelligence or culture, who does not consider it necessary, before returning home, to master roughly, the difference between "*Buddha*" and "*Siva*," and to carry back with him some proof of the results of his studies. The rich vein of Indian antiquarian interest once opened, the brass trays of Benares hardly satisfy the cultivated mind, and a brisk demand springs up for genuine fragments from Sānchi or old sculplings from Sárnāth. The danger is perhaps not so much from the tra-

veller himself as from the Philistine class of guides and collectors whom the tourist creates. Hangers-on may now be found at many Indian hotels who devote a portion of the dull season to grubbing up the antiquarian relics of the neighbourhood and who during the tourist months display and descant on the value of their spoils in the verandah of Indian hotels. There is hardly anything too cumbrous in the shape of an inscription or figure for your cultivated tourist to collect, and to my certain knowledge, figures, inscriptions and bas-relief, whether of much real value, I cannot say, have been carried out and are being carried out of the country by tourists together with Benares toys, brass trays, and Delhi jewellery.

It may be held that the above view is somewhat exaggerated, and that if anything at all is really carried away, it is of little value and hardly worthy of objection. But admitting this, it will not be denied, there is some danger for the future, when the demand will most assuredly increase. From my own observation, I can state that there is little to prevent any one from digging at Sárnáth and carrying off and placing to no remunerative use, what in the hands of General Cunningham might be of real value to antiquarian research. And what applies to Sárnáth, may, so far as I know, hold good for many other parts of India, the antiquarian treasures of which are only now beginning to be explored.

As regards coins, the recent Treasure Trove Act now provides for some chance of the preservation, examination and publication of coins of interest, many of which would otherwise go into the melting pot, or into the hands of so-called collectors, who, as I have myself seen, think little of piercing the legend in order to utilise the coin as an ornament. But what is there to prevent the new class of guides or their myrmidons, when they have once realised the market value of such relics, from collecting slabs and tablets of more or less interest, for sale to travellers who are not certain to be able to appreciate their worth? And travellers are not the only offenders. Old carvings and sculpturings and inscribed tablets may sometimes, I believe, be seen in the rockeries or ferneries of station gardens. At present there is nothing, so far as I know, to prevent me, or any one like myself who pretends to take an interest in antiquarian research, from digging up a tumulus or demolishing the ruined wall of a temple, and annexing and placing to no real remunerative use, the relics which in the hands of an expert might prove of no small value in the determination of vexed points in Indian history.

The Hon'ble Mr. Egerton, C. S. I., the present Lieutenant-Governor of the Punjab, when Commissioner of Nagpur, discovered in a field near Rám-ták an inscribed slab which was found to contain a copy of Asoka's well-known edicts; although the edicts had been discovered in many other parts



of India, their existence in the wild out-of-the-way Nagpur Province was unknown. This discovery, placed by Mr. Egerton in the hands of General Cunningham, has proved of real value, as shewn by his recently published volume on Indian Inscriptions. But one cannot depend upon such treasures always falling into the hands of men like Mr. Egerton. Others ignorant of its value, might think little of bricking such a tablet into a wall or of utilising it, as I myself have seen an inscription used, to replace the broken leg of a school form.

What I urge is, that antiquarian remains, unless other well established interests exist, should be considered to be State property, and should be brought under the protection and management of the State, in the manner that Sir J. Lubbock's Act suggests, or as is provided for in the French system of "*Administration des Monuments Nationaux.*" And, save under permission from competent authority, I would not allow any one to dig, or demolish on any such ground, or to remove or place to his private use any specimen or relic that may be discovered. Investigations or excavations should be carried on upon an approved plan, the fortunate discoverer of anything of interest being obliged, as I believe is the rule in the Central Provinces, to report the result of his investigation to the Collector or Deputy Commissioner. A full description of the discovery should then be forwarded to the Government, and to the Asiatic Society, and the specimens found should, if necessary, become the property of Government for preservation in the Indian Museum. I would not of course advocate that the finder should not have every encouragement to describe the result of his labours, or obtain full credit for his research. To do this, would be to remove what often is the chief incentive to work and to dig. But local antiquaries may not always be competent to test whether a discovery is really of value or not. My object is to insist on the result of all such investigations being subjected to the test of efficient criticism, with a view to the publication of the results, where they are of value, and to prevent what may be of real interest being carried out of the country by those who may or may not appreciate its merits.

The subject, I submit, is not unworthy of the attention of the Asiatic Society of Bengal, which has done so much to promote an interest in, and to secure a record of the progress of Indian antiquarian research.

If supported by the weight of the recommendation of the Society, the idea would, I am sanguine, receive the attention of the supreme Government, many of whose members have evinced a valuable interest in the preservation of what still remains to us of the monuments of the Ancient History of India.

In conclusion, I would desire again to call the attention of the Society



to the remarks contained in my Memorandum of January of last year, published in the Society's Proceedings for February 1877, regarding the neglected condition of the celebrated Buddhist Stúpa at Sárnáth. Until recently, at least, no attempt had been made to save this grand old relic from ruin. The trees are still applying the powerful levers of their roots to the masonry of the tower. The massive stones with their beautiful tracery are being gradually but surely displaced, and must fall if some measures are not promptly taken to clamp or support them. If they do fall, I am quite confident there are many enterprising tourists who will gladly bid for the fragments of one of the most remarkable monuments of its class in the world.

Since this was written a notice has appeared of the discovery, as was to be expected, of valuable antiquarian remains in the country now occupied by our troops in Affghanistán. If no action has yet been taken it would be desirable, I submit, that instructions should issue that excavations should be carried out on a well-considered plan, and under competent supervision, and that the relics found should be kept together, and not distributed.

The following paper was read.

*On the Operations for obtaining the Discharges of the large Rivers in Upper Assam during 1877-1878 —By* LIEUT. J. H. HARMAN, R. E., *in charge, Assam Valley Series, Survey of India. Communicated by* MAJOR-GENERAL J. T. WALKER, R. E., C. B.

This paper will be published in the Journal, Part II.

The reading of the following paper was postponed.

*The Snake Symbol in India, especially in connection with the Worship of Siva.—By* H. RIVETT-CARNAC, Esq., C. S., C. I. E., &c.

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## LIBRARY.

The following additions have been made to the Library since the Meeting held in January last.

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## TRANSACTIONS PROCEEDINGS AND JOURNALS. *presented by the respective Societies or Editors.*

Benares. A New Hindustani-English Dictionary,—Part 18, November 1878.

Bombay. The Indian Antiquary,—Vol. VII, Part 87, December, 1878.  
Vol. VIII, Part 88, January, 1879.

- Pt. 87. *Rev. G. Shirt.*—Traces of a Dravidian Element in Sindhi.—*H. Rivett-Carnac.*—Masons' marks from old buildings in the North West Provinces of India.—*G. S. Leonard.*—Notes on the Kânphâtâ Yogis.—*J. F. Fleet.*—Sanskrit and Old Canarese Inscriptions, Nos. XLVIII and XLIX.
- Buenos Aires. Sociedad Científica Argentina,—Anales, Entrega V, Tome VI, Novembre 1878.
- Calcutta. The Indian Medical Gazette,—Vol. XIV, No. 1, January, 1879.
- . Geological Survey of India,—Records, Vol. XI, Part 4.
- Dr. W. Waagen.*—On the Geographical Distribution of Fossil Organisms in India.—*G. E. Ormiston.*—Submerged Forest on Bombay Island.
- . Mahâbhârata,—No. 80.
- London. The Athenæum,—Nos. 2668 to 2670, December, 1878, and No. 2671, January, 1879.
- . The Geographical Magazine,—Vol. V, No. 12, December, 1878.
- . Nature,—Vol. XIX, Nos. 476 to 478, December, 1878 and Vol. XIX, No. 479, January 1879.
- Palermo. Società degli Spettroscopisti Italiani,—Memorie, Dispensa 10 to 11, 1878.
- Paris. La Société de Géographie,—Bulletin, Septembre, 1878.
- Antoine d'Abbadie.*—Instruments à employer en voyage.
- . Journal Asiatique,—Tome XII, No. 1, Juillet, 1878.
- Philadelphia. Monthly Bulletin, April to May, 1877, and Vol. II, Nos. 7 to 11, July to November 1878.

## BOOKS AND PAMPHLETS.

*presented by the Authors.*

- ADHARLAL SEN, B. A. Lalita Sundari and Kabitabali, I Vol.
- DAMOODAR SASTRI. Vidyarthi, 6 Nos.
- RAJA RAMA VERA. Prâyaschitta bhâga,—Pts. I and II, 4 Nos.
- TOLBORT, T. W. H. Ra'Binsan Kru'So,—Vol. I.

## MISCELLANEOUS PRESENTATIONS.

- BLAEU. La Geographie Blaviane, 12 Vols.

M. L. DAMES.

- BURGESS, J. Archæological Survey of Western India, 1878.
- GOUGH, A. E. Papers relating to the collection and preservation of the Records of Ancient Sanskrit Literature in India.
- HUGHES, REV. T. P. Notes on Muhammadanism, 2nd Edition.

HOME DEPARTMENT.

COOKE, DR. M. C. Report on the Oil Seeds and Oils in the India Museum, 1876.

Report on the Administration of the Customs Department in the Bengal Presidency for 1877-78.

Report on the Revenue Survey Operations of the Lower Provinces from 1st October 1876 to 30th September, 1877.

Report on the Administration of Bengal for 1877-78.

GOVERNMENT OF BENGAL.

RICE, L. Mysore and Coorg, Vol. III.

CHIEF COMMISSIONER'S OFFICE, COORG.

Selected Extracts from the Minutes of the Trustees of the Indian Museum, April 1877 to March, 1878.

INDIAN MUSEUM.

OVERBEEK, L. B. Bijdrage tot de Kennis der Weersgesteldheid ter Kuste van Atjeh, 1877.

DIRECTOR OF THE OBSERVATORY,—BATAVIA.

Report on the Administration of the Punjab and its Dependencies 1878.

GOVERNMENT, N. W. P.

Report on Public Instruction in the Madras Presidency, 1876-77.

MADRAS GOVERNMENT.

MARKHAM, C. R. A Memoir on the Indian Surveys, 2nd Edition.

### PERIODICALS PURCHASED,

Bombay. The Vedarthayatna, or an attempt to interpret the Vedas, Book 2nd, No. 14.

Bordeaux. Société de Géographie Commerciale,—Bulletin, No. 24.

Giessen. Jahresbericht über die Fortschritte der Chemie,—Zweites Heft, 1877.

Göttingen. Göttingische gelehrte Anzeigen,—Stücken 49 to 52.

———. ————. Nachrichten,—No. 16.

Leipzig. Annalen der Physik und Chemie,—Band V, Heft 4, 1878.

*H. Helmholtz.*—Telephon und Klangfarbe.—*R. Nahrwold.*—Ueber die Luftelectricität.—*R. Rühlmann.*—Ableitung der Formeln für Messungen der Meeres-tiefen mit Hülfe des Manometers..

———. ————. ————. Beiblätter,—Band II, Stück 11, 12.

London. The Academy,—Nos. 345-347, 1878.

———. The Annals and Magazine of Natural History,—Vol. II, No. 12, 1878.

*T. Workman.*—Description of two new Species of Spiders from Rangoon (Plate XVIII, figs. 1 and 2).

- London. The Chemical News,—Vol. XXXVIII, Nos. 994 to 996, 1878.
- . The Entomologist,—Vol. XI, No. 1878, December, 1878.
- . The Entomologist's Monthly Magazine,—Vol. XV, No. 175, December, 1878.
- . Society of Arts,—Journal, Vol. XXVII, Nos. 1360 to 1362, December, 1878.
- No. 1360. *H. Clarke*.—Railways to India and Turkey.
- . The London, Edinburgh, and Dublin Philosophical Magazine and Journal of Science,—Vol. VI, No. 39.
- E. Edlund*.—Researches on Unipolar Induction, Atmospheric Electricity, and the Aurora Borealis. *O. Heaviside*.—On a test for Telegraph Lines.
- . The Messenger of Mathematics,—No. 91, 1878.
- . The Nineteenth Century,—No. 22, December, 1878.
- Maj. Genl. Sir H. C. Rawlinson*.—The Afghan Crisis. *W. R. S. Ralston*.—Beauty and the Beast. *Sir E. Perry*.—The Future of India.
- Paris. Revue et Magasin de Zoologie,—3<sup>e</sup> Serie Tome 6, No. 4, 1878.
- M. Girard*.—Recherches de M. Dareste, sur la production artificielle des monstruosités.
- . Annales de Chemie et de Physique, T. 15, Octobre, 1878.
- M. Berthelot*.—Sur les mélanges explosifs formés d'air et de poussières combustibles. *L. Foucault*.—Du spectre solaire et de son influence sur la vision dans les instruments d'optique.
- . Comptes Rendus,—Tome 87, Nos. 23 to 26, 1878.
- No. 24. *M. E. J. Mauméné*.—Sur la puissance d'absorption de l'eau par les bois.
- . Journal des Savants,—Novembre, 1878.
- M. M. Barthélemy Saint-Hilaire*.—Sept Suttas Palis, tirés du Dighâ-Nikâya.
- . Revue des deux Mondes,—Tome 30, 3<sup>e</sup> et 4<sup>e</sup> Livraisons, Decembre, 1878.
- . Revue Critique,—Nos. 49-52, Decembre, 1878.
- . Revue Scientifique,—No. 16, Octobre, 1878 and Nos. 23, 24, 25, Decembre, 1878, and No. 27, Janvier 1878.
- No. 23. *M. Rawlinson*.—La Question Afghane.
- No. 24. *Exposition Universelle*.—Les voitures de chemins de fer—La verrerie et la cristallerie.
- No. 25. *M. A. Angot*.—Les Inventions d'Edison.
- No. 27. *M. Duclaux*.—Charbon et Septicémie.

PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL.  
FOR MARCH, 1879.

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The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th instant, at 9 o'clock P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The receipt of the following presentations was announced—

1. From C. H. Dall, Esq. On the Remains of Later Pre-historic man obtained from the Caves in the Catherina Archipelago, Alaska Territory.

2. From Babu Ram Dás Sen. Aitihāsika Rahasya, Parts I and III.

3. From the author, Dr. Rájendralála Mitra, Rai Báhádur, C. I. E., Buddha Gya, the Hermitage of Sakya Muni.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected Ordinary Members :—

C. E. Buckland, Esq., C. S.

M. von Eetvelde.

E. O'Brien, Esq., C. S.

Major J. Biddulph.

Capt. G. J. von Someren.

H. C. Levinge, Esq., C. E.

A. W. Garrett, Esq.

Major H. S. Jarrett, B. S. C.

Major J. Herschel, R. E.

A. Weekes, Esq., C. S.

R. Pawsey, Esq., C. S.

S. Harraden, Esq.

The following are candidates for ballot at the next meeting :

The Right Rev. the Lord Bishop of Calcutta, proposed by Capt. J. Waterhouse, seconded by Mr. W. T. Blanford.

A. C. Lyall, Esq., C. S., for re-election, proposed by Mr. W. T. Blanford, seconded by Mr. C. H. Tawney.

Babu Ram Saran Dás, M. A., Makbulgunj, Lucknow, proposed by Dr. R. L. Mitra, Rai Bahádur, C. I. E., seconded by Capt. J. Waterhouse.

The SECRETARY announced that Mr. W. E. Bateman had tendered his resignation of the post of Assistant Secretary and Librarian to the Society, and that Mr. W. A. Bion had been appointed in his place on trial for 3 months.

The SECRETARY read the names of the following gentlemen, appointed by the Council to serve on the several Committees during the ensuing year :

*Sub-Committee of Finance.*

|                                               |                          |
|-----------------------------------------------|--------------------------|
| H. Beverley, Esq., c. s.                      | T. S. Isaac, Esq., c. E. |
| H. B. Medlicott, Esq.                         | Dr. J. Anderson.         |
| Dr. Rájendralála Mitra, Rái Bahádur, c. I. E. |                          |

*Library.*

|                                    |                                   |
|------------------------------------|-----------------------------------|
| Dr. Rájendralála Mitra, c. I. E.   | A. W. Croft, Esq., M. A.          |
| Colonel J. F. Tennant, B. E.       | Dr. W. K. Waller.                 |
| Colonel J. T. Walker, c. B., B. E. | C. H. Tawney, Esq., M. A.         |
| Dr. D. D. Cunningham.              | The Hon. Whitley Stokes, c. s. I. |
| Babu Prannath Pundit, M. A.        | H. H. Locke, Esq.                 |
| R. S. Brough, Esq.                 | R. Parry, Esq.                    |
| H. F. Blanford, Esq.               | H. B. Medlicott, Esq., M. A.      |
| Dr. O. Feistmantel.                | H. Beverley, Esq., M. A., c. s.   |
| John Eliot, Esq., M. A.            | J. Crawford, Esq., M. A., c. s.   |
| A. M. Nash, Esq., M. A.            | Dr. Mohendralal Sircar.           |
| Dr. J. Anderson.                   | Babu Pratapa Chandra Ghosha.      |
| A. Pedler, Esq.                    | J. C. Douglas, Esq.               |

*Philology.*

|                                     |                                   |
|-------------------------------------|-----------------------------------|
| Dr. Rájendralála Mitra, c. I. E.    | Moulvie Abdul Latif Khán Bahádur. |
| C. H. Tawney, Esq., M. A.           | Moulvie Kabiruddin Ahmad Sahib.   |
| Major-Genl. A. Cunningham, c. s. I. | Babu Dijendranath Thákúr.         |
| J. Beames, Esq.                     | The Hon. Whitley Stokes, c. s. I. |
| F. S. Growse, Esq.                  | Babu Prannáth Pundit, M. A.       |
| Rev. K. M. Banerjea, LL. D.         | Dr. G. Thibaut.                   |
| Babu Gaur Dás Bysack.               | H. Rivett-Carnac, Esq., c. I. E.  |
| Dr. Mohendralal Sircar.             | Babu Pratapa Chandra Ghosha.      |
| The Hon'ble J. O'Kinealy.           | Dr. A. F. R. Hoernle.             |
| Capt. H. W. Clarke, B. E.           |                                   |

*Natural History.*

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|------------------------------|--------------------------------|
| H. F. Blanford, Esq.         | S. E. Peal, Esq.               |
| H. B. Medlicott, Esq., M. A. | W. E. Brooks, Esq., C. E.      |
| Dr. O. Feistmantel.          | Dr. W. Schlich.                |
| D. Waldie, Esq.              | R. Lydekker, Esq.              |
| A. O. Hume, Esq., C. B.      | Capt. G. F. L. Marshall, R. E. |
| Dr. D. D. Cunningham.        | Dr. J. Anderson.               |
| Dr. J. Armstrong.            | Lieutenant F. W. Jarrad, R. N. |
| Dr. G. King.                 | Dr. D. Brandis.                |
| L. Schwendler, Esq.          |                                |

*Physical Science.*

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|------------------------------------|------------------------------|
| Colonel J. T. Walker, R. E., C. B. | John Eliot, Esq., M. A.      |
| H. B. Medlicott, Esq., M. A.       | T. S. Isaac, Esq., C. E.     |
| H. F. Blanford, Esq.               | Colonel J. F. Tennant, R. E. |
| D. Waldie, Esq.                    | Commander A. D. Taylor.      |
| A. Pedler, Esq.                    | Dr. O. Feistmantel.          |
| R. S. Brough, Esq.                 | R. Lydekker, Esq.            |
| Dr. D. D. Cunningham.              | The Hon'ble J. O'Kinealy.    |
| A. Cappel, Esq.                    | A. M. Nash, Esq., M. A.      |
| A. W. Croft, Esq., M. A.           | J. C. Douglas, Esq.          |
| C. H. Wood, Esq.                   | L. Schwendler, Esq.          |

*Coins.*

|                                  |                                     |
|----------------------------------|-------------------------------------|
| Colonel J. F. Tennant, R. E.     | Major-Genl. A. Cunningham, C. S. I. |
| Dr. Rájendralála Mitra, C. I. E. | Colonel F. W. Stubbs, R. A.         |
| Rev. M. A. Sherring.             | H. Rivett-Carnac, Esq., C. I. E.    |

The SECRETARY read the following extract from a demi-official letter, dated 21st February, 1879, from Major H. C. B. Tanner to Major-Genl. Walker, Surveyor General of India.

"I told you in a former letter that I had found a new language. I am steadily going on with it for it is closely allied to the language of the Kafirs. My interpreter Hassain Khan, a resident of Kunar, teaches me; it is his mother-tongue, and he has brought to my aid one of the Sirdars of Kunar, Mir Ahmed Khan of Shewa (or Kél as the Kunar people call it). The Mir is very intelligent and has influence among all the tribes to his north, and I am quite confident that I require only his help to get me a footing in Kafiristan. He often comes to see me, and takes the greatest interest in my study of his language. He makes me read over what I have written down, for he says that I must learn the pronunciation of the upper and not of the lower classes.

"Shewa is at the mouth of Dara Núr (Valley of Light?) which runs into the Kund mountain. The villages up the valley are inhabited by Dehgans who are not Pathans, but descendants of the original people of this country (probably); and Mir Ahmad Khán has great influence among them. Beyond Dara Núr, there comes Mázár Dara which rises also in Kund, and flows S. E., falling into the Kunar River at Nurgal, and it is the inhabitants of this valley who are my stumbling-block. They are Pathans and Safis and have never become subjects of the Amír; and the other day, when the principal chief of the Kunar valley was coming in to tender his allegiance, they attacked him in force. Beyond Mazar Dara there flows Chauki Dara, also rising in Kund but having a course almost easterly (as I take it). The inhabitants are Safis and Momands and are not subjects of the Amir, and are therefore *yaghi*, or independent as they are termed.

"Now, beyond Chauki is Pech, a valley (or dara) also rising in Kund but flowing N. E. into the Kunar River. Of Pech I know little or nothing; but it is beyond Pech that the interesting and unknown tract of Kafiristan commences, and it is to introduce to you two of the inhabitants of the valley N. W. of Pech, that I have entered into this long and tedious preface. I had long heard of a tribe called Chúguni and I therefore sent the Subadar (Hussain Khan my interpreter) to bring some of them in to me. These Chúgunis are the next door neighbours of the Kafirs and live in a valley, which as far as I can understand, flows from Kund northwards and then turning east empties itself into the Kunar near Chágár Sarai.

"They are a powerful clan, and can number 6000 fighting men, but are true wild men of the hills, and seldom come as far as Jelalabad; and like all true and wild mountaineers, dislike to expose themselves to the unknown perils which may be experienced in travelling in an open plain. To sell their *ghi*, cheese and wood, the Chúgunis cross the head waters of the valleys I have named, and come down into the Dara Núr, at *Amla* (Indian name); and it was at that place that the Subadar found the two specimens which he brought to me. He had to give his nephew as a hostage and make many protestations of friendship before they would consent to come. Wild ragged fellows they were, of pale complexions and thin features. Their legs were clothed with coarse goat's hair socks, then an outer covering of goat's hair and such curious untanned shoes tied on in a cunning fashion. One of them spoke nothing but his own language, but the other, who was described to me as being a great warrior, spoke Pushtu; so with the Subadar as an interpreter we got on very well together. I kept the men four days and during that time, when I had leisure, managed to elicit a good deal of information about them and their valleys. The "warrior" informed me that he had been brought up amongst the Kafirs, and indeed I



found that his own language differed but little from that of the Kafirs which he appeared to know thoroughly. I learned—I cannot say with any amount of pleasure—that there are nearly as many languages in Kafiristan as there are tribes, but of this I am pretty well sure, that the one which I have been learning from the Subadar, may be taken as typical of the whole. I asked the Chúguni the numbers in the Kafir tongue, and they almost exactly correspond with those given by Burns, but the dialogue given by him differs as much from the Kafir language of my Chúguni, as the latter does from the Kunar language, which may be broadly called the Kunar dialect of the Kochis.

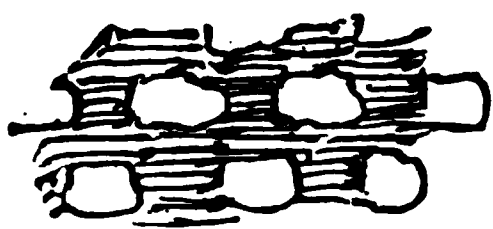
“My two wild men soon tired of this place and its novel and strange sights, and went away assuring me that my life would be protected by them in their own valley, as they would protect their own heads. They have gone under a promise to bring back two Lál Kafirs, and are to be here in 8 days, and it is with the Chúgunis that I must enter Kafiristan if I do it at all. They are half Kafir themselves, and though professed Mussalmáns they seem to have their sympathies more with the hereditary enemies of their co-religionists than with the Muhammadans.”

Capt. WATERHOUSE exhibited some gold and copper coins and relics &c. found by Mr. W. Simpson in the Ahin Posh Tope near Jelalabad, and read the following letter from Mr. Simpson to Colonel Colley regarding them.

“Yesterday morning (16th February,) I penetrated to the centre of the Ahin Posh Tope, and found the cell. In it there lay about two or three handfuls of what I suppose to be ashes, 18 gold coins, and a golden relic-holder, for wearing by a cord round the neck. It is  $3\frac{1}{2}$  inches long, and in it were 2 gold coins and a small dark-coloured substance which I suppose was a relic. All these objects I have delivered over to Major Cavagnari, who is sending them off to Calcutta for Lord Lytton.

“I write this to give a very slight account of the position of the cell and the finding of the objects, all of which will no doubt be of interest to His Excellency. The tope is about 80 feet diameter, but I had to begin the gallery from what remains of the square base, which gave me about 45 feet of digging; and judging from other topes with galleries which were made to get at the articles deposited, I guessed that it would be wisest to go on the level of the lowest bed of stones. When the gallery reached the centre, the cell was at my feet.

“It had been formed of slates and on the surface of the ground. We apply the term “Buddhist Masonry” to the kind we find here. It is of stones with a slate packing. The accompanying sketch will give its



character. This peculiar kind of masonry may have had the earthquakes of this country in view. The Ahin Posh Tope is externally of this kind of building, but through the whole 45 feet of masonry within,

there was nothing but large water-worn boulders embedded in mud, and it was very hard work to dig them out. So when the men at last unbared some slate, I knew that the centre had been found. I was anxious to know exactly how it was arranged, and caused the stones to be cut out till I had got beyond it, and felt that there was no more slate either on its offside or at either end. I then lifted up a large slate about 3 feet long—beneath this was another large slate—and on raising it the central cell was opened. It was about 15 inches on each of its sides, I think it was intended for a perfect cube, about 15 courses of slate—I rather think it was 14 courses—I hope to measure it more perfectly. The most conspicuous object was the golden relic-holder. I had expected a jar with the ashes in it, but they simply lay on the bottom of the cell. The bottom being also slate—I could see one coin among the ashes, and as I began to gather them, coin after coin was found, till at last I counted 18 of them in all.

“There are some Roman coins among them, and one is of the reign of Domitian. This is important, as giving at least an approximate date to the Tope. That Emperor died 96 A. D., so the Tope cannot be dated earlier than that. I believe it is some centuries later.

“I am not up in coins, and we have no one here at the moment who can tell us about them, but you will no doubt be able to get them all explained when they reach Calcutta, and I should feel obliged for any account of them that may be made.

“I have also given Major Cavagnari some unimportant copper coins and other objects found in the excavation.

“The final destination of the coins &c. is a matter for Lord Lytton to determine. I would say either the Lahore Museum or the Indian Museum at South Kensington. Kindly point out to Lord Lytton that it would be as well to consider also where all sculptures and other archæological finds should be sent for presentation, and where they would be of use to Archæologists.

“I am now told that the exploration of the many topes we see here already opened was the work of Masson. Why he left such a prominent tope as the Ahin Posh one untouched I do not know. There is another very large one, it is 100 feet diameter, known as the “Ummer Kheyl tope,” which I think is untouched, I feel now a very strong desire to have it opened. About three-fourths of the topes hereabouts have been

opened, but I know a good number which are still with their finds within them, but the Ummer Kheyl one ought to give us something: a message from you would get it done quickly.

“ I am still going on bringing to light what remains of the architecture of the Ahin Posh Tope, and we have now visible some figures in plaster which remain on the square base. In a few days it will be so far advanced that a proper plan can be made.”

Capt. WATERHOUSE said that of the 20 gold coins 3 were Roman and the remainder Greek, one showing a good figure of the preaching Buddha with an inscription in Greek BOΔΔΟ. The relics and other articles consisted of a gold relic-holder inlaid with garnets and containing two gold coins and a piece of relic.

A piece of clear white glass with dark blue raised bands.

2 pieces of shell.

11 copper coins.

1 piece of red stone.

1 small leaden bullet.

1 small glass (?) bead.

1 piece of fused glass.

He had heard that these coins and relics had been received by the Viceroy, and thinking that they would be of interest to the Society, he had written to the Private Secretary for permission to exhibit them at the meeting.

Dr. HOERNLE and Mr. TAWNEY made some remarks on the coins.

The PRESIDENT said that the Society was greatly indebted to His Excellency the Viceroy for an opportunity of seeing these interesting coins &c. As they had only been received that evening there had been no time to examine them thoroughly as yet.\*

Dr. HOERNLE exhibited a MS. of the well known Prákrit grammar of Vararuchi, edited by Professor Cowell. In many points its readings differ considerably from those of the published text. For example after viii. 37, there is an entirely new sutra : *chhijjabhijjáv apy eke || chhijjai, bhijjai ||* The phraseology of the commentary is generally different and very much more concise. The Sanskrit translations of the Prákrit examples are, as a rule, omitted. Instead of 12 chapters there are only 10 ; the last one containing all the rules of the usual 10th, 11th, 12th chapters and dividing them merely by the remarks *iti paisáchi* after x, 14, and

\* Dr. Hoernle has succeeded in determining all the coins, among which he finds two unique ones. They will be described at the next meeting. Ed

*iti mágadhí* after x, 31 (=xi, 17). The last rule x, 63 (=xii, 32) has the following commentary added: *maháráshṭrodbhavám bháshám viṣud-dham prákṛtam viduḥ, ity uktāḥ* ||. The whole ends with the formula *iti Vararuchivirachitáyám manoramáyám vṛttau bháshavibháshávi-bhágo náma daṣamaḥ parichhedāḥ* || *samáptá cheyam manorama vṛttiḥ* ||. The commentary accordingly is here ascribed to Vararuchi himself, and not, as usual, to Bhamaha; so also at the end of the 2nd chapter, *iti vararuchikṛtáyám manoramávṛttau dvitíyaḥ parichhedāḥ* ||. On the other hand at the end of the 1st chapter the formula is *iti vararuchikṛte prákṛtaprakáṣe prathamāḥ parichhedāḥ*. In the remaining chapters no author is mentioned at all; the uniform formula being *iti manoramáyám vṛttau (tritíyaḥ etc) parichhedāḥ*. The MS. bears no date; but its appearance is old. The characters are Nágari; now and then rather indistinct from age; in other places evidently re-drawn wrongly, sometimes by a later hand. It consists of 11 leaves (paper), of 18 lines each. It belongs to Paṇḍit Rámadatta of Amritsar (Panjáb). An accurate list of all its various readings has been made.

The following papers were read:—

1. *The Snake Symbol in India, specially in connection with the Worship of Siva.* By H. RIVETT-CARNAC, Esq., C. I. E., M. R. A. S., F. S. A., &c.

(Abstract.)

The author begins by stating that the snake as a personal ornament or as a canopy surmounting the figure is not confined to representations of Siva, but is to be seen overshadowing Vishnu, Garuda and others. The snake symbol also appears in the prehistoric cromlechs and menhirs of Europe, in which also traces of phallic worship may be traced. The author's attention has been given to the subject chiefly in connection with the worship of Siva, with a view to ascertain whether the worship of the snake and that of Mahádeo or the phallus may be considered identical, and whether the presence of the serpent in the prehistoric remains of Europe can be shown to support his theory that the markings on the cromlechs and menhirs are indeed the traces of this form of worship, carried to Europe from the East by the tribes whose remains are buried in the tumuli.

The author then describes a series of articles in brass, obtained in the Benares bazar, in which the snake is found in one form or another. These articles accompanied the paper, and were exhibited to the Meeting.

The paper will be published in the Journal, Part I.

Since the meeting, Babu Pratapa Chandra Ghosha has kindly forwarded the following note on the articles exhibited by Mr. Carnac.

It is interesting to observe how the ornamental and the artistic help in complicating the myths of the Hindu religion. The occurrence of the snake on several of the articles exhibited is ornamental in some and inconsistent with the Sástras in a few. The snake on the spoon or ladle is for ornamental purposes, and that on the bell is altogether out of place. The Sástras make no mention of the necessity of any such figures on the handles of spoons, sacrificial ladles or water-pots. In the case of the bell the only figure directed to be represented on a religious bell is that of Garuḍa, the bird-god. The Padma Purana has the following—"He is not a Bhágavat (worshipper of Bhagaván) in this iron age who has not in his house a conch-shell or a bell surmounted by a Garuḍa or the bird-god." Such a bell as the above is used in the worship of Vāsudeva (Vishnu). And although in the Sástras regarding the worship of Siva and Rámachandra, it is nowhere provided that the bell used in such service should be adorned with figures of snake and Hanuman, (the monkey-god), the váhanas of the two gods respectively, yet the bell-maker in his devoutness has added these figures to the bell thinking that such a bell would serve the threefold worship of Siva, Vishnu and Rámachandra. The white paint of sandal-wood paste on the lingam in the form of a circle or a semicircle and a dot, is intended to represent the sacerdotal thread (*poitá*) and the mark (*phontá*) and, in the case of the semicircle, the half moon which is said to adorn the forehead of Siva.

In the paper on Tree and Serpent worship published in Part I, No. 3, J. A. S. B. for 1870, Ananta the serpent king is said to have a thousand heads and four arms. In the Briddha Baudháyana quoted by Hemádri, a Nága is ordinarily described to have five heads.

कुर्यान्नागं सुवर्णेन फणा पञ्चकसंयुतं ।

In the Visvakarmá Sástra, Anantá is said to have a hundred thousand heads, and the other secondary eight Nágas to have seven heads each.

चेतदेहस्य कर्तव्यः स्फुरन्मौक्तिकसन्निभः ।

+ + + + + + + +

द्विजिह्वो वाहवः सप्तफणा मणिसमन्वितः ।

A Nága is said to have hoods and the body of a man, the lower extremities being like those of a reptile. A *sarpa* or serpent is a reptile. The three-headed or the nine-headed snakes are imaginative figures, they have no foundation in the Sástras. The figures of snakes forming backs of

the shrines exhibited are evidently artistic and ornamental, they have no direct connection with serpent worship.

Cup-marks occurring in the vicinity of sepulchral monuments suggest their origin in the Smritis, in which it is stated that after the cremation of the body, the son of the deceased is directed to offer water and milk नीर and क्षीर to the manes of the departed, and the water and milk are generally presented in unburnt clay cups, and it is not unoften that they are poured in little hollows made with the finger on the soft ground of the river side where the funeral ceremony is generally performed. May not the cup-marks on stone slabs represent these water and milk cups offered to the spirits of the departed?

The ant hill has been known to be a resort of snakes where these reptiles have been seen to coil themselves up for comfortable and warm lodging. The eggs of ants and the queens of the same are well known favourite food of snakes.

## 2. *Précis of a Report on Electric Light Experiments.*—By L. SCHWENDLER, Esq.

MR. SCHWENDLER said it would be impracticable to read the “*Précis of Report on Electric Light Experiments*” *in extenso*, since it contained too many technicalities which could not easily be followed if the paper were read in the manner usual at these meetings, and that he therefore would prefer to give verbally a short account of his researches and the results obtained. He stated that the enquiry originated with General Strachey who, in April 1876, recommended to the Secretary of State that a trial of illuminating Indian Railway Stations by the electric light, should be made. In February 1877, Mr. Schwendler was requested to institute detailed enquiries which led him to propose that it would be advisable to first make some more experiments, before a practical trial at Indian Railway Stations should be attempted. The Board of Directors of the East Indian Railway Company agreed to this, and sanctioned the necessary outlay, whatever it might come to.

The experiments made at the India Office Stores, London, terminated on the 1st November, 1878. The report, however, could not be finished in time, before Mr. Schwendler left for India, and he therefore prepared a *Précis*—the paper before the meeting to-night. After pointing out the general results obtained, and explaining in a brief manner the three principal questions at issue, viz.—

*Economy of the electric light; practicability and efficiency of the electric light for certain illuminating purposes; and best means of distribution of the electric light*—Mr. Schwendler proceeded:

You all have heard no doubt a great deal about the division of the electric light. During the last two years this question has been before the public almost permanently. This is not to be wondered at if we consider that on the solution of this problem it will ultimately depend whether the new mode of lighting becomes a successful and general rival to the illumination by gas, or other combustive means. But before entering on the subject it will be best to formulate the question definitely, to avoid any misunderstanding with respect to the answer I am about to give. The question is: A given permanent current ( $C$ ), no matter how produced, does work in a closed single circuit of total resistance ( $R$ ), of which a part ( $r$ ), represents the resistance of *one* electric arc. This electric arc produces an electric light of *measured* intensity ( $I$ ). Now if we introduce instead of *one* arc, *two* arcs of resistance  $r'$  and  $r''$  and measured light intensities  $i'$  and  $i''$  respectively, and suppose the current to be the same as before—or the E. M. F. and total resistance in the single circuit the same, then *a priori* we should conclude that  $I = i' + i''$  for  $r = r' + r''$ . Experiments, however, show that this is not the case, *i. e.*, the sum of the measured intensities of *two* small lights is perceptibly smaller than the measured intensity of *one* large light, and this difference becomes larger and larger as we increase the number of lights produced by the same current, *i. e.*, by the same E. M. F. with the same total resistance in circuit. This appears at first sight an inconsistency with the known laws of *cause* and *effect*. How is it possible that the *same* current through the *same* resistance should produce more light in *one* point than in *two* points, although the total amount of work done by the given and constant current is exactly the same in *one* point as in *two* points?

That the *measured* intensity of *one* light, is invariably greater than the sum of the measured intensities of  $n$  lights, is an undoubted fact proved by my own experiments very conclusively. But we may well ask what has become of the energy which is expended and does not appear as light?

A careful analysis of all the physical facts connected with the subject will, however, show easily enough how this apparent loss of energy is to be accounted for, without reverting to far-fetched explanations, and without the necessity of making such statements as: "the division of the electric light is in contradiction to dynamic principles;" or "the laws of nature must be reversed"—whatever that may mean; or "new laws have to be discovered first, before a solution of this important problem could be even attempted;" &c. &c., which I have read frequently in scientific or professional journals and newspapers. Statements of this kind appear very clever to the uninitiated, and they are exceedingly cheap to make, but they



will invariably do an enormous amount of harm towards the further progress of an important application of the resources of nature.

It will be seen from the foregoing that I have called the light intensity—*measured* intensity. For if we produce a light by any source, it will be at once perceived that not *all* the light produced by that source can be made available for illuminating purposes. A part of the total light will be lost for the special purpose of illumination, inasmuch as only a part of the total light is in a position to act on the Photometer, or which is the same, on the retina. Hence we may say, the total light produced by any means consists of two parts—the one is lost for illuminating purposes, and may be called *internal* light; the other acts on the retina, can be measured, and may be called *external* or *measured* light. For instance, of all the light produced in *one* electric arc, a considerable part is hidden by the electrodes between which the arc plays. Because the electrodes have a volume, and moreover the positive electrode is hollowed out like a dome, and it is the highest point of that dome, which contains the most intense light, which is mostly lost. How much this loss in each case will be, depends on a variety of circumstances. In the first place, all other conditions being the same, that loss will increase with the thickness of the electrodes. The loss of light will further increase with a decrease of the length of the arc. By length of arc is to be understood the distance between the highest point of the hollow of the positive electrode and the apex of the negative electrode. Hence already in the case of *one* arc, although naturally we have here the longest arc, for the given current and the given electrodes, the light lost or the *internal* light may represent a considerable portion of the total light produced in the arc.

If we produce *two* arcs, it will be seen *at once* that the sum of the losses must be greater than the loss in *one* arc. Hence the sum of the measured intensities of two lights must also be smaller than the measured intensity of *one* light. Suppose the length of *one* arc, when a given current passes, is 3 m.m., then the sum of the lengths of *two* arcs will not be 3 m.m., but much less, in order to have the same current passing through the *two* arcs as passed before through *one*. From this it follows that the loss of light must increase rapidly with the number of lights, and moreover that soon a limit to the possible practical division of the electric light is reached, leaving out the question of economy altogether.

This constitutes one of the reasons why the division of the electric light becomes less and less economical with increase of the number of lights, and that soon a practical limit will be reached for the division.

To express this result more definitely, we may say :



The consumption of power per unit of *measured* or *external* light is an increasing function with the number of lights produced by a given current in a single circuit.

Supposing, of course, always that the sum of the resistances of  $n$  arcs is equal to the resistance of *one* arc, and that the other resistance in the circuit, in which no light is produced, has remained constant throughout.

If we had a material infinitely conducting, of infinite strength, and with a melting point at least as high as that of carbon, then surely the division of the light would be perfectly economical, up to any limit, inasmuch as we might then use linear electrodes.

In practice we can only try to approach this limit. Up to the present time, there appears to be no better material for electrodes than carbon, either natural or artificial. But this is no reason why an effort should not be made to try to find a material for electrodes more accommodating to the division of the electric light than even carbon. The above, limited strength, limited electric conductivity and limited melting point of the material of electrodes, constitutes only *one* of the difficulties, which stand in the way of an unlimited economical division of the electric light.

A second cause is for instance the fact that in each arc an E. M. F. is established in opposition to the original E. M. F. and by no means to be neglected against it. This secondary E. M. F. established in each arc, appears to be a function of the current which passes the arc, most likely proportional to that current. Hence, if for a given current passing *one* arc this secondary E. M. F. be  $e$ , then the same current through  $n$  arcs, successively connected, would produce an E. M. F. equal to  $ne$ . This secondary E. M. F.  $ne$  is to be subtracted from the original E. M. F., and internal resistance of the original E. M. F. plus resistance of leading wires having remained constant, we necessarily have to decrease the total resistance of the  $n$  arcs in order to work with the same current as before. This merely means a decrease of the total length of the  $n$  arcs, or which is the same, an increase of internal light or decrease of the *measured* or *external* light. A parallel connection of the  $n$  arcs with reference to the poles of the given original E. M. F. would certainly produce only *one* secondary E. M. F. instead of  $n$ , and for this reason it might be better to use the parallel circuit for the division of the electric light. But there are other very important objections to this solution. In the first case, as can be easily shewn, the variation of *one* arc has a far greater influence on the variation of the others, in parallel, than in successive circuit. Further, the length of each arc must be made very much smaller, in parallel circuit than in consecutive circuit.

Another reason against an unlimited economical division of the elec-

tric light is constituted by the practical necessity that lamps, of whatever construction they may be, have a resistance inherent to their nature in addition to the resistance of the arc. For instance, in an ordinary lamp with an electromagnet, the resistance of the lamp consists of the resistance of the electromagnet plus the resistance of the two electrodes when metallically closed. This resistance, although small, is by no means nil, and cannot be neglected against the resistance of the arc, especially when strong currents are used. In other words, when producing the electric light in  $n$  points instead of one point, we are unable to fulfil practically the condition, that the sum of the resistances of the  $n$  arcs is equal to the resistance of *one* arc to have the same current, *i. e.*, the former must be made smaller than the latter on account of practical construction-reasons.

We may therefore sum up as follows: *The economical solution of the division of the electric light is theoretically quite possible, but practically difficult to obtain.* The division can never become unlimited, but ingenious inventors may nevertheless *solve the problem practically.*

Any attempt by inventors to solve the question is therefore perfectly legitimate. If their attempt cannot lead to a perfect solution, they may nevertheless do so approximately, and by it tend towards real progress in illumination, inasmuch as by their attempts the electric light may probably become more and more a successful general rival to gas, which at present it certainly is not.

Before I conclude, I must briefly advert to a paper on "the Electric Light" by Mr. W. H. Preece, published in the *Philosophical Magazine* for January 1879, in which the author believes that he has demonstrated from dynamical considerations that the division of the electric light is impossible. This it certainly is under the conditions introduced by Mr. Preece, *viz.*, that the resistance of each voltaic arc, or each incandescent wire, is maintained *constant*. But it is unfair to the electric light to introduce this condition, especially as it does not at all represent the question at issue.

When a number of lights are connected in series, the resistance of each must be diminished, and when a number of lights are joined parallel, the resistance of each must be increased, in proportion to their number, so as to maintain the total external resistance constant. If Mr. Preece will introduce this condition into his equations he will find that theoretically the division of the electric light is quite possible, *i. e.*, that, theoretically, however the lights be arranged, the unit of light will always be produced by the same expenditure of energy. Inventors should not therefore be down-hearted. On the other hand, investors in gas need not hasten to get rid of their shares, for there are many questions involving

practical difficulties which still remain to be solved ; but, at the same time, gas companies should be aware that they have a formidable rival in the field, and bestir themselves to maintain the lead they hold by improving their own means of illumination and extending its application.

*Précis of the Report on the results obtained by the Electric Light Experiments instituted on behalf of the Board of Directors of the East Indian Railway Company.—By LOUIS SCHWENDLER, Superintendent Electrician of Government Telegraphs in India (on special duty in England), dated 1st November, 1878.*

*Results obtained.*—The questions which I set myself to answer by *direct experiment* were :—

I.—QUANTITY OF LIGHT PER UNIT OF POWER, UNIT OF SPEED,  
AND UNIT OF MONEY (FIRST OUTLAY).

To solve this question I have tried four different Dynamo-electric Machines producing the electric current in *one* direction, viz.—

Dynamo-electric Machines { A Medium size,  
B Small,

as supplied by Messrs. Siemens, Brothers, of London (construction :—Siemens ; system :—Hefner von Alteneck).

Dynamo-electric Machine C, *workshop pattern*, as supplied by Messrs. Soutter & Lemonnier, of Paris (construction :—Gramme).

Dynamo-electric Machine D, with two sets of brushes, as supplied by the British Telegraph Manufactory (construction :—Gramme).

Careful, severe, and long-extended trials, during the time of my experiments, have established that these four machines are all sufficiently practical for the production of the electric light, but that, as a rule, the statements of their actual efficiency were not found to be in conformity with the results obtained from my own experiments. The quantity of light produced by these dynamo-electric machines had been *overrated*, and the amount of power consumed *underrated*.

This discrepancy between my results and those of others is probably to be explained by the difficulties which stand in the way of executing trustworthy photometric measurements.

But, notwithstanding this, I find that the unit of light as produced in the electric arc (*disintegration*) by any of the four dynamo-electric machines is *at least* fifty times cheaper than the unit of light as produced by combustion, considering the expenditure of power only.

This represents an enormous engineering margin in favour of the electric light.

It is, however, necessary to state that this relation only holds good as long as *one* dynamo-electric machine produces *one* electric light.

The three dynamo-electric machines B, C, and D I found practically equal, *i. e.*, they produce the same quantity of light by the same expenditure of power. Any difference which may be found is entirely within the limits of observation and other errors.

But the dynamo-electric machine A gives a much stronger light for a comparatively smaller expenditure of power.

In round numbers it may be said that dynamo-electric machine A gives about double the quantity of light given by any of the other three machines, and that only about half as much power is expended to produce the unit of light.

This favourable result is principally due to the comparatively small internal resistance of A, and its low speed.

With reference to mechanical construction and regular working, dynamo-electric machine C is highly efficient.

My experiments necessarily have suggested alterations and improvements of the dynamo-electric machines, with which, however, I shall not deal in this précis of the Report.

## II.—CONSTANCY AND REGULARITY OF THE ELECTRIC LIGHT.

This appears to be still the weak point, and many improvements in this respect are possible and desirable.

Although it is not in the nature of dynamo-electric machines to produce a *perfectly steady* current, like, for instance, galvanic batteries, the irregularity of the light resulting from this source can be entirely neglected against those produced by the lamp itself.

I have tried two different lamps :—

(a) *The Serrin Lamp*, as supplied by Messrs. Soutter & Lemonnier, of Paris, and the British Telegraph Manufactory.

(b) *The Siemens Lamp*, as supplied by Messrs. Siemens, Brothers.

The Serrin lamp, for any given adjustment, regulates the length of the arc only in *one* direction, *i. e.*, it diminishes that length.

The actual consumption of the carbon points regulates the length of the arc in the other direction, *i. e.*, increases it.

In the Siemens lamp the decrease of the length of the arc is effected exactly in the same manner as in the Serrin lamp, but the increase in the length of the arc is not only left to the consumption of the carbon points—a comparatively slow process—but is accelerated by the addition of a make and break arrangement, which separates the carbon points.

Hence, from a theoretical point of view, the Siemens lamp is undoubtedly superior, since the length of the arc is rapidly adjusted in both

directions, and consequently the working currents can increase to a very considerable degree without spoiling the dynamo-electric machine.

But practically I find the Siemens Lamp somewhat difficult to manage, and although, when *once* well adjusted, it burns as regularly as the Serrin Lamp, it is far more difficult to arrive at this adjustment.

For practical use I prefer, therefore, the Serrin Lamp, with those alterations and constructional improvements which my own experiments have suggested. I shall not refer to these improvements here.

A second cause of the irregularity of the electric light is the still imperfect state of the carbon points.

They sometimes split, break off, burst, and crumble. Under these circumstances, not even the most perfect lamp will produce a steady light.

Of late some great improvements have been made in the manufacture of artificial carbons, but much more is required; and this point deserves the closest attention. In my final Report I shall treat this subject in detail. With the improvements which I have been able to introduce in reference to lamps, position, form, and nature of the carbons, the electric light (emanating in a line passing through the centre of the arc, and being normal to the axis of the arc) is still exceedingly variable (ranging in intensity during short intervals of time between 1 and 3).

It is true that these variations in the light are flashes lasting for a moment only; but they are nevertheless there, the eye perceives them, and they are disagreeable.

To make the electric light more steady should be considered one of the most important questions to be solved.

### III.—HOW TO PUT UP THE LIGHT—POSITION AND MECHANICAL DETAILS.

To solve this question is of the greatest practical importance.

Two essentially different methods are available :—

*Division of the Electric Light, i. e., to produce by the same electro-motor a number of lights at different points of a given space.*

This method, besides being scarcely solved, appears to be impracticable from an engineering point of view.

Such divisions of the electric light can only be effected by a large sacrifice of total and external light, and moreover this loss increases rapidly with the number of lights burned in the same circuit.

It appears that the electric light can alone compete with light produced by combustion, when produced of great intensity in *one* point by *one* dynamo-electric machine.

Endeavours to cut up the electric light into a large number of small lights, although of great interest, must, I think, invariably result in engineering failure, as nobody could afford to pay for the luxury received.

I have succeeded in working three Serrin Lamps connected up successively in the same circuit of a dynamo-electric machine, but found the loss of light very great.

Having satisfied myself of the difficulty and impracticability of the division of the electric light, I tried:—

*Diffusion, i. e.*, a few large lights (each light produced by one machine), are placed at different points of the space, and by optical means the light is diffused over a large area.

This method I find perfectly practicable.

There is naturally also a large amount of light lost (by absorption), but this loss will bear a constant ratio to the total light produced, nay probably may decrease with the intensity.

The actual plan by which I propose to do it, and have done it during the trial, is to construct a *Silvered-glass* reflector in which a powerful electric light burns, throwing *direct* and *reflected* rays up to a white ceiling or any other convenient white surface. A number of such arrangements is to be put up in the most convenient places, and where they have the greatest effect.

The form and size of each reflector will depend on the locality where it is to be used.

In future constructions of railway stations the lighting up by the electric light should be taken into account.

#### IV.—WHAT REPAIRS ARE REQUIRED IN COURSE OF TIME, AND ARE THEY OF SUCH A NATURE THAT AN ORDINARY MECHANIC CAN EXECUTE THEM?

Any repairs which during this extended trial had to be made were entirely limited to the commutator, and the brushes of the dynamo-electric machines. These repairs were exceedingly simple, and any native mechanic would be able to execute them.

I consider the Commutator or Dynamo-Electric Machines A and B the best.

Practice will however answer this question much more effectively than any experimental trial can do.

The commutators are to be often cleaned, and the brushes are to be well set.

Although the electric lamps look rather formidable, they are nevertheless very simple apparatus, not easily getting out of order if well adjusted.

## V.—ROUTINE; DIFFICULTY OF MANIPULATION AND SUPERINTENDENCE.

Only *one* man is actually required in each station, to take charge of the steam engine, dynamo-electric machine, lamps and reflectors.

This man should be of a rather high intelligence to be able to understand the working of the system, the adjustment of the dynamo-electric machines and lamps.

He should be a skilled mechanic in order to be able to execute the necessary repairs.

A simple Test-Galvanoscope is to be used to gauge from time to time the efficiency of the dynamo-electric machine in producing a current through an external resistance equal to *one unit*.

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APPENDIX I.

GENERAL SPECIFICATION OF A DYNAMO-ELECTRIC MACHINE  
REQUIRED FOR USE IN INDIA  
(*East Indian Railway*).

The dynamo-electric machine to be of the same size and pattern as the one manufactured by Messrs. Siemens, Brothers, of London, under the name, "Medium sized," and which in my report has been called A.

The following alterations of the present construction are to be made :

1. The induction-cylinder to be wound with *twelve separate sections* of wire, instead of with *six*, as at present.

2. The commutator, therefore, to consist of *twenty-four* copper plates, instead of twelve, as at present.

3. The diameter of the commutator to be increased in the proportion of 3 to 4 *at least*. In all other respects to be, however, of exactly the same construction as the present one, which from a construction point of view is *perfect*.

4. Number of brushes, *four*, as at present, with the difference that they should consist of *several* layers of finer wire instead of *one* layer of thick wire as is the case at present. 12 sets of brushes are to be issued with the machine in question.

5. The present adjustment of these brushes (with reference to pressure on the commutator, and relative position to the poles of the electro-magnet) wants some improvements.

It is required for a safe and regular working of a dynamo-electric machine that the adjustment of the pressure of the brushes against the commutator should not only be more *handy*, but also *finer*, and that the adjustment for finding approximately the neutral line of the commutator should be made more *convenient* and *finer*. The proper practical fulfilment of these two conditions is of paramount importance, and if the present



construction should not allow of such improvements, it is worth while to alter that construction somewhat. Further, the insulating material between the brush-holders and moveable collar should be made much thicker.

6. The driving pulley of the dynamo-electric machine should keep its present diameter, but should be made broader in order to be able to use a wider strap for driving. A loose pulley should run on the axis of the induction cylinder.

7. An iron plate must form the separate base of the dynamo-electric machine, and when putting up the dynamo-electric machine this iron plate is fixed either to a beam or to masonry. Along this iron plate the actual bottom plate of the dynamo-electric machine is to slide in grooves, so that it may be fixed in any one position by four strong screws with nuts.

8. The magnetic field in which the induction cylinder moves, should be a *uniform one*.

In the present construction this is *not* the case. The magnetism at the ends is much stronger than in the middle, but it is probable that making the poles of a solid piece of iron would alter this.

This should be tried, and if it answers should be introduced in the present specified dynamo-electric machine.

9. The terminal screws of the dynamo-electric machine should not be *hand screws* as at present, but strong hexagonal-headed screws with lock-nuts, and the outside wires connecting electro-magnets with brushes and induction cylinder should be insulated like the rest of the wire used in the electro-magnets.

10. When the above dynamo-electric machine is delivered, the following statements must be given :—

Total weight, including everything.

Weight of iron used in the electro-magnet.

Weight of iron used in the induction cylinder (not including the axis).

Weight of copper used in the electro-magnet, and

Diameter of wire in millimetres.

Weight of copper used in the induction cylinder, and

Diameter of wire.

Total internal resistance of the dynamo-electric machine, as found by direct measurement through the brushes.

Resistance of the separate coils of the electro-magnet.

Total resistance of the induction cylinder, as found by *direct* measurement.

Resistance of each separate section.



All resistances to be expressed in S. U. and the temperature to be stated at which the measured resistances are right.

As these resistances are all very small, they should be given to 3rd decimal; hence a special bridge for testing must be used.

11. The speed of driving is to be between 700 and 750 revolutions per minute, and at this speed through a known external resistance, the current produced *should not be less* than that given by the following formula :—

$$C = 0.3 \sqrt{\frac{W^1 - w^1}{m + r}}$$

where C is the current in Webers.

$W^1$  the power required per second to produce that current.

$w^1$  the power per second to drive the dynamo-electric machine empty (external resistance infinite, *i. e.*, circuit open).

Both  $W^1$  and  $w^1$  are expressed in Meg Ergs\* per second.

1 Meg Erg = 1,000,000 Ergs.

$m$  is the internal resistance of the dynamo-electric machine, *i. e.*, resistance of electro-magnet plus resistance of induction cylinder plus contact resistance in the commutator as found by direct measurement when *all* brushes are on.

$r$  is the external resistance; both  $m$  and  $r$  expressed in S.U.

When gauging the dynamo-electric machine by the above formula it is best to make  $r = 1$  S.U. *about*.

If the dynamo-electric machine produces less current (say more than 10 per cent. less) then there is something wrong either in the machine or with the measurements. If it is in the machine it may be due to the following causes :—

Brushes make bad contact and do not approach sufficiently near to the neutral line; try therefore a better adjustment; or there is a shunt in the machine which can best be found by driving the machine empty; or the iron is bad, &c., &c., &c.

The actual measurements are to be forwarded with the dynamo-electric machine.

*Note.*—The above formula has been calculated from the experimental fact that at the production of currents above 20 Webers, the loss of power in making current is about 12 per cent. If all the force used for producing current were represented in the external circuit by that current flowing through a known resistance, then the formula would be :—

\*—7460.6 Meg Ergs per second equal *one* Watt's H.P. per second, *i. e.*, 550 foot-pounds per second in London.

$$C = 0.33 \sqrt{\frac{W^1 - w^1}{m + r}}$$

therefore the observed current never can be higher than this value, and this fact gives a criterion for trustworthy observation.

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GENERAL SPECIFICATIONS OF AN ELECTRIC LAMP REQUIRED  
FOR USE IN INDIA (*East Indian Railway*).

The lamp to be constructed on the *Serrin principle*, with the following alterations :—

1. All parts of the lamp, including clockwork, &c., &c., to be made of gun-metal. No steel or iron is to be used except in the electro-magnet and its armature.

Even the axles of the wheels and the fly-escapement must be made of gun-metal.

2. The carbons to be used in this lamp may be of any shape—round, triangular, or square. The carbon-holders should be sufficiently large to hold a round carbon of 18 mm. diameter; and should be constructed in such a manner that they can hold carbons of a much smaller diameter, and also that by the expansion due to heating, the carbons should not become loose in their clamps.

The construction of the carbon-holders in the Siemens lamp appears to be good, and should be adopted in this lamp.

With 18 mm. carbons the lamp should burn 8 hours.

3. The screw for regulating the tension of the spring or springs which act in opposition to the magnetism of the electro-magnet should move 1 mm. by one whole turn.

In order to know the adjustment at any one time, and to be able to make the *same* adjustment again, a millimeter scale is to be attached, by which the movements of the screw can be read. The circumference of the head of the screw is to be divided into ten equal parts. Hence by this arrangement the comparative tensions of the spring or springs can be read up to 0.1 mm.

This micrometer screw, after the lamp has been regulated for any given current varying within two known limits, is to be fixed by a clamp and screw to keep that adjustment *constant*.

4. The distance between the electro-magnet and its armature is also to be made adjustable by a micrometer screw, provided again with millimeter scale like the above, and with a clamp and screw, for making any best adjustment *constant*.

5. The clockwork and all regulating parts of the lamp to be entirely covered by a strong metal case, which is to be constructed in such a manner that it can be taken off or put on without interfering in any way with the adjustment of the lamp. The best, I think, would be to make that case cylindrical, opening like a door in two halves on hinges, and with a key for closing it. There is no limit to the actual size of the case, since the lamp is intended for lighting up by the method of "diffusion" with an opaque reflector, which is placed and begins *above* the cover.

None of the adjustable parts of the lamp are to protrude, as it is intended not to touch the lamp after its proper adjustment, which is done in the laboratory only.

It is quite a mistake to give people easy regulating means. That will never answer in practice. People, as a rule, will turn anything in the opposite direction they ought to do; then they get excited, and the failure is attributed to the lamp instead of to the people.

Each lamp has only *one* best adjustment for any given current varying between two known limits, and the best adjustment is made constant by fixing everything. The case or cover is then closed, and the lamp put up for use.

6. The electro-magnet which pulls the arc should offer no more resistance than 0.02 S.U. It is to be *shunted* by another Electro-Magnet which offers exactly the same resistance (0.02 S.U.)

Hence, one half of the current passes through the electro-magnet of the lamp, and is made use of *for pulling the arc*. The amount of iron used in the electro-magnet, and the number of convolutions should be such, that at the mean distance of the electro-magnet from its armature, the magnetic force is strong enough to produce an arc of 2.5 mm. against the mean tension of the spring or springs when employing a current of about 25 Webers.

The magnetic action of the shunt for the same current should be about double that of the electro-magnet of the lamp, in order to leave a margin for a finer adjustment, *i. e.*, equalization of the magnetic action of the two.

In the foregoing it has been supposed that the shunt does not act on the armature. But it can be easily conceived that the free magnetism of that shunt may be made to assist the electro-magnet for regulating the arc.

I consider it, however, better not to do this, especially when the currents produced are sufficiently strong, above 30 Webers, which will be the case when using a dynamo-electric machine, as described in the first part of this Appendix.

The two electro-magnets, each forming a shunt to the other, are adjusted in such a manner, that the extra currents they produce, when the primary current varies, are equal, and therefore, as they are invariably opposite to each other, they neutralize one another entirely, which will have the desired effect of a quicker regulation of the lamp for any variation of current.

The iron used in the shunt should have double the weight of the iron in the electro-magnet.

The section of the wire for filling the shunt should be double the section of the wire filling the electro-magnet.

Coil on so many convolutions on to the shunt until its resistance becomes equal to the resistance of the electro-magnet.

For adjusting the equality of the extra currents the following method should be adopted:—

Form a Wheatstone bridge two sides of which are formed by a mercury-rheostat, each side offering about 0.02 S.U. resistance. The third side of the bridge is formed by the electro-magnet of the lamp, the fourth side by the shunt. In one diagonal place a dynamo-electric machine and about *one unit* resistance, together with a convenient make-and-break contact, best done by a mercury cup. In the other diagonal, place a Bell-telephone of lowest possible resistance. One end of this diagonal can be moved along the mercury-rheostat. Start the dynamo-electric machine, listen to the telephone and alter the ratio of the mercury-branches of the bridge, by shifting along the contact until the telephone is perfectly silent.

Then if, at commencing and stopping the current a strong click is heard, we know it is due to the two extra currents not being equal, and as we further know that the shunt produces the greatest extra current, we make this extra current smaller, by shifting along the two poles of the shunt, an iron wedge until the telephone is quiet, when starting and stopping the current. The iron wedge is then fixed in its position.

This shunt is also to be *inside* the metal cover of the lamp.

7. The two terminals of the lamp are to be of exactly the same pattern and size as those used in the dynamo-electric machine described in the commencement of this Appendix.

They must *not* be terminals with hand screws.

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### APPENDIX III.

#### ON SOME OF THE SCIENTIFIC RESULTS OBTAINED BY EXPERIMENT.

SYSTEM OF UNITS ADOPTED:—In my investigations I have adopted the *Centimetre-Gramme-Second* system of units.

(Illustration of the Centimetre-Gramme-Second (C.G.S.) system of units, by J. D. Everett.)

In Appendix I.\* attached to the Report, all the required data are given for easy reference.

MEANS OF MEASUREMENT :

*The Tangent Galvanometer* which is described in Appendix (II) of the Report.

By means of this instrument, constructed in special manner to suit the particular purpose, all the currents between 1·6 to 38 webers could be measured very accurately.

The currents, in absolute measure, may be taken as correct within 3 per cent. *at least*. The Astronomer Royal most kindly gave me the value of the horizontal component of the earth's magnetism at Greenwich.

*The Photometer* described in Appendix III. The comparison of two lights by means of this instrument rests on the following principle :—

Two surfaces, equal in size and nature, are placed side by side, quite close together, and in the same plane.

One surface is illuminated by one light, the other surface by the other light.

This is best done by using two equal flint-glass prisms.

The surfaces towards the eye are covered with tracing paper, the top half of each paper being divided by fine pencil lines into small squares.

The equalization of the intensities of the two lights under comparison is done by keeping the distance between the two lights *constant*, and moving the two illuminated surfaces *within* that constant distance.

This Photometer is particularly well adapted for comparing the intensities of two differently coloured lights.

An experienced eye can easily distinguish the relative distinction between the pencil line and the back ground of each surface, and if this relative distinction is the same in both surfaces, the two surfaces have equal intensity, no matter what the colour of each light may be. However, as a rule, the comparison of any two lights was made by observing the two surfaces through a *red glass*. This glass, after trying a great variety of glasses, was found to have the convenient quality of making the colours of the electric light and of the standard light equal.

It was ascertained that this red glass absorbs all the violet, blue, and green rays, letting through only some yellow, more orange and all the red.

\* All the Appendices referred to in the following belong to the actual Report, of which the present paper is a Précis only.

Hence if the two lights under comparison contain the different coloured rays in different proportions, it may be said that by adjusting balance by means of the red glass, the ratio must become erroneous.

However, actual experiments proved that this is practically not the case. If there is a difference it is quite within the limits of errors caused by the considerable variation in the intensity of electric lights.

Two electric lights compared with each other by means of the red glass and without it, gave practically the same ratio.

Further, the same electric lights compared each with a standard light (either a standard-candle or a platinum-light standard, to be described further on), and by adjusting balance through the red glass gave a ratio sufficiently close to the one found by direct comparison of the two electric lights. I can therefore recommend this photometer for practical use.

*The Dynamometer*, described in Appendix (IV). When transmitting force by means of a strap from a *driving* pulley to a *driven* pulley, it will be noticed that that side of the strap which runs *towards* the *driving* pulley has always a greater tension than the other side of the strap which runs *from* the *driving* pulley.

This difference of tension in the two sides of the same strap is proportional to the force transmitted, a well and long recognised fact. The difference of tension is measured either by a graduated spring or weight, and hence the force can be calculated if the *constant* of the dynamometer is known.

From this and the speed the power consumed per second can be calculated. Dr. C. W. Siemens called my attention to this very simple, convenient, and accurate method of measuring force transmitted and power consumed. It is a method not to be found in any text-book, and was first suggested and employed by Mr. Hefner von Alteneck, of Berlin.

A drawing to scale of the dynamometer, as actually made, is attached to Appendix IV.

*The measurement of speed.* See Appendix V. In this investigation, where almost all results depend on the speed of the induction cylinder, it becomes a matter of importance to select the proper apparatus for measuring that speed accurately.

I have employed three essentially different instruments:—

*The Pocket-Counter*—an instrument well known and extensively used.

*The Mercury Speed Indicator* by J. M. Napier. The speed is measured by a column of mercury, which increases its length when the speed increases. It is a most convenient instrument.

*The Cycloscope*, this is another very ingenious instrument for mea-

asuring the speed continuously, and is an invention of Lieut. G. S. Clarke, R. E., and Professor McLeod.

The principle of the cycloscope consists in employing a tuning fork or reed as the standard by which to measure velocities of rotation. The instrument is described in the Proceedings of the Royal Society, 1877, Vol. XXVI.

*Resistance measurements.* See Appendix VI.

An ordinary Wheatstone bridge with S.U. has been employed.

By careful comparison I find,

$$1 \text{ B.A.U.} = 1.0509 \text{ S.U.}$$

The resistance measurements are all correct within 0.01 S.U.

*Standards of Light employed.* See Appendix VII.

*The Standard Candle.*

The Metropolitan Gas Act of 1860 defines the Standard Candle as follows :—

“Sperm candles of six to the pound, each burning 120 grains an hour.”

To keep the flame of a candle at exactly the same position in the photometer, a condition required for accurate photometric measurements, I place the candle in a closely fitting tube against the top rim of which a spring presses the burning candle.

*The Platinum Light Standard (P.L.S.)*

The unit of light is defined, as the light emitted from a piece of pure platinum weighing ( $x$ ) grammes and having the most convenient shape and size, when a constant current of ( $y$ ) webers passes through it.

The current can be easily kept constant by a convenient battery, and by inserting in the circuit a galvanoscope and adjustable mercury-rheostat. The deflecting wire of the galvanoscope should consist of one thick copper wire only. On the galvanoscope the point is marked off which corresponds to a current of ( $y$ ) webers.

This Standard produces a light of perfect constancy, so long as the current is kept constant, and further allows a correction to be made if the variation of the current is known.

It is further a standard which can be reproduced very accurately anywhere, and its magnitude may be altered to any extent to suit certain practical purposes, by simply varying the elements of the weight, shape and size of the platinum, or the strength of the current passing through it.

It does not alter in itself. Hence the Platinum Light Standard fulfils all the conditions of a good standard, and I therefore propose it should be used in future as the standard of light in England, in lieu of the standard candle.



## RESULTS.

*Economy of Electric Light.*

The energy of the standard candle was ascertained by *direct experiment*. See Appendix VIII.

It was found that the standard candle, in order to produce the unit of light, does work at the rate of 610 meg-ergs per second, *at the least*.

In fact it is highly probable that the standard candle, in order to produce the unit of light, works up to more than double that amount (1365 meg-ergs per second).

Further, by direct experiment, it was ascertained that the unit of light, as produced in an electric arc, by any one of the dynamo-electric machines under trial, and through a leading wire offering not more than 0.1 S.U. resistance, is produced at the rate of not more than 20 meg-ergs per second, including *all the work transmitted*, and the light measured in a line which passes through the centre of the arc, and stands normal to its axis. Hence the probable engineering margin in favour of the electric light is between 30 to 70, or equal to a mean of 50.

Dynamo-electric machine A produces the unit of light at a rate of not more than 10 meg-ergs per second.

Hence it may be safely asserted that the electric light produced by dynamo-electric machines is as an average 50 times cheaper than light by combustion.

This is, however, true only as long as the light is produced in *one* arc.

If more than one light is produced in the same circuit by the same current the external or available light becomes rapidly dearer with increase of the number of lights produced.

For this reason already, if not for many others, the *division of light* must result in an engineering failure.

It is in the nature of the electric light that it should be used in *great* intensity in *one point*, instead of small intensities in *many* points.

For the experimental details and complete information on this interesting point. See Appendix IX.

*Current produced by Dynamo-Electric Machines.* See Appendix XI.

These currents, as the insertion of a bell-telephone (used as a shunt) will easily prove, are *not steady*.

The dynamo-electric machine with the greatest number of sections in the induction cylinder gives the steadiest current. Twelve sections I find *necessary* and *sufficient*.

*Influence of Speed.* See Appendix X.

The current produced by any dynamo-electric machine through a given constant total resistance in circuit increases permanently with the speed of the induction cylinder.



This increase of current for low speeds is more than proportional to the speed; afterwards it becomes proportional; and for high speeds the increase of current is less than proportional to the speed.

The current has, however, no maximum for any speed, but reaches its greatest value at an infinite speed.

This same law, as the total resistance in circuit is supposed to be constant, of course holds good also for the electro-motive of the dynamo-electric machine.

*Influence of External resistance.* See Appendix XII.

Keeping the speed constant, the electro-motive force of any dynamo-electric machine decreases rapidly with increase of external resistance.

This decrease is more rapid, the smaller the internal resistance of the dynamo-electric machine is made.

Hence the currents must decrease much more rapidly than proportional to the total resistance in circuit.

As in the case of speed, the electro-motive force has no maximum for a certain external resistance, but approaches permanently its greatest value for an external resistance equal 'Nil.'

It appears that the function which connects E. M. F. and speed, is the same as that which connects E. M. F. and external resistance.

We have only to substitute for speed the inverse of resistance and *vice versa*.

*Maximum work by a current in the resistance R.*

As the current decreases much more rapidly than the total resistance in circuit increases, this resistance R should invariably be made *smaller* than the remaining resistance of the circuit, i. e., smaller than the internal resistance of dynamo-electric machines plus resistance of leading wires.

See Appendix XI and the special proof attached.

*The Electro-motive force of a Dynamo-Electric Machine as a function of the resistance and speed.*

It appears that the following two formulæ are most probably correct for *all* Dynamo-Electric Machines, if the loss of current by transmission is taken into account:—

$$E = \kappa \left\{ 1 - e^{-\left(\frac{a}{m+r}\right)^2} \right\}$$

E the E. M. F.

*m* the internal resistance, and *r* the external resistance, including resistance of leading wire.

$\kappa$  and  $\alpha$  are independent of  $m$  and  $r$ , and are functions of the speed of the induction cylinder, and contain also the construction coefficients.  $e$  is the basis of the natural logarithm.

Further :—

$$E' = \kappa' \left\{ 1 - e^{-\left(\frac{v}{\alpha'}\right)^2} \right\}$$

$E'$  the E. M. F., and  $v$  the speed of the induction cylinder.

$\kappa'$  and  $\alpha'$  are independent of  $v$ , and are functions of  $m$  and  $r$  only.

These two functions,  $E$  and  $E'$ , correspond to all the characteristics of the curves found by experiment, and they also fulfil the limit conditions.

In Appendices IX and X, the question has been gone into fully.

*Resistance and Electro-motive force of the Electric arc.*

There appears to be no doubt that an appreciable E. M. F. in the arc is established which acts in opposite direction to the electro-motive force of the dynamo-electric machine.

This E. M. F. of the arc *increases* with the current, passing through the arc.

The resistance of the arc for constant length is also a function of the current passing through it, *i. e.*, the resistance of the arc *decreases* with the current, see the following table :—

| Current<br>in Webers. | Resistance of<br>the Arc in S.U. | E.M.F. of the<br>Arc in Volts. |
|-----------------------|----------------------------------|--------------------------------|
| 28.81                 | 0.91                             | 2.02                           |
| 23.87                 | 1.72                             | 1.91                           |
| 16.27                 | 1.97                             | 1.86                           |

See Appendix XI. The E.M.F. in an electric arc, opposite to the electro-motive force of the dynamo-electric machine, constitutes another reason against the unlimited divisibility of the electric light.

*Regularity of the production of Currents by Dynamo-Electric Machines at different periods.*—If the brushes are well set, and if they are placed as nearly as possible in the neutral line of the commutator, the production of current is perfectly regular, and measurements taken through the same external resistance at the most distant periods agree most perfectly with each other, supposing the correction for variation in speed and internal resistance are applied.

Disregarding the heating of the dynamo-electric machine by the current, the time required to arrive at dynamic equilibrium, *i. e.*, when

force transmitted, current and magnetism received are constant, is very short indeed, especially for the strong currents, which alone are made use of for lighting.

*Formula for controlling the Test-results.*—As the power which is represented by the measured current working through a given resistance can never exceed the original power transmitted to the machine, we can, from current, resistance, and force measurements, frame a formula which checks the probability of the results.

This formula is :—

$$C \leq 0.33 \sqrt{\frac{W' - w'}{r + m}}$$

$W'$  is the *total power* consumed by any dynamo-electric machine when producing the observed current  $C$  in a circuit of resistance  $r + m$ .

$w'$  is the power consumed by the dynamo-electric machine when producing *no current* (*i. e.*, driven empty; circuit open; external resistance infinite).

$r$  is the external resistance, and  $m$  the internal resistance.

In the above formula  $C$  is in webers,  $W'$  and  $w'$  in meg-ergs per second, and  $r$  and  $m$  in S.U.

Of late, exaggerated statements of the performance of dynamo-electric machines have been made, the absurdity of which would have become evident at once if the above formula had been applied as a check to the results.

*Co-efficient of transmission.*—If all the work ( $W' - w'$ ) were transformed into *available* current in the external circuit then :—

$\frac{W' - w'}{W} = \text{unity}$ , where  $W$  is the total work performed by the observed current in the circuit of known resistance.

In practice it will be found however that  $\frac{W' - w'}{W} > 1$  (for many reasons).

This expression,  $\frac{W' - w'}{W}$ , I have called :—

The *co-efficient of Transmission* and designated it by the letter  $\kappa$ .

$\kappa$  is different for the different dynamo-electric machines, which have been tried, and decreases with increase of current.

Producing currents above 24 webers, the following average values of  $\kappa$  have been obtained :—

| Name of Dynamo-Electric Machines. | $\kappa$ | Average Current in webers. |
|-----------------------------------|----------|----------------------------|
| C                                 | 1.01     | 31.0                       |
| A and B                           | 1.12     | 31.0                       |
| D                                 | 1.28     | 27.9                       |

*Co-efficient of Efficiency.*

$$\epsilon = \frac{w}{W' - w'} ; w \text{ is the useful work done in the circuit by the current.}$$

As the resistance of dynamo-electric machines and leading wires cannot be made “nil,” this co-efficient must be always smaller than unity.

For currents above 24 webers we have :—

| Name of Dynamo-Electric Machine. | $\epsilon$ | Average Current. |
|----------------------------------|------------|------------------|
| A                                | 0.62       | 29.5             |
| B                                | 0.53       | 31.0             |
| C                                | 0.47       | 32.6             |
| D                                | 0.30       | 27.9             |

Hence the dynamo-electric machine A converts 62 o/o of the total energy transmitted into useful work, while 38 o/o is lost in heating the machine.

Dynamo-electric machine D converts 30 o/o of the total energy transmitted into useful work, and loses 70 o/o in heating its own wires.

*Practical Mechanical Equivalent of the currents produced by Dynamo-Electric Machines.*

$$\eta = \frac{W' - w'}{C} \text{ where } C \text{ is the current in webers.}$$

Above 24 webers, the different dynamo-electric machines produce the weber at the following consumption of power :—

Dynamo-electric machines A and B produce *one* weber at 686.5 meg-ergs per second.

Dynamo-electric machine C produces *one* weber at 736 meg-ergs per second.

Dynamo-Electric Machine D produces *one* weber at 920 meg-ergs per second.

N. B.—Through certain external resistances which are sufficiently small to get currents above 24 webers.

*Regularity of the Electric Light—*

If the resistance external to the dynamo-electric machine is represented by the resistance of the arc only, *i. e.*, resistance of leading wires equal “Nil,” then although the light is naturally the most powerful, it is the least steady, since any variation of the resistance of the arc has then evidently the largest influence on the current and on the light.

By connecting across the electro-magnet of an electric lamp, another electro-magnet which acts as a shunt, and adjusting the two electro-magnets in such a manner that they produce *equal extra currents* when variations in the primary current take place, the regularity of the working of the lamp is greatly enhanced.

(See Specification of Lamp, Appendix I, of Précis of Report.)

An electro-static shunt will have a similar effect. *For strong lights or strong currents*, the electro-magnetic shunt is best ; for *weak lights or weak currents* the electro-static shunt is best.

The lamp should be constructed mechanically so well and delicately that the carbon points run together with a minimum tension of the spring of the lamp. Then the lamp will be a balance with small weights.

When making photometric measurements, to get more trustworthy results, it is best to use a *flat carbon* (2 to 3 mm thick) as the positive electrode, and a carbon of the usual form as the negative electrode.

The light is to be observed in a line normal to the flat surface of upper carbon, and passing through the centre of the arc. In this manner the largest quantity of *total light* produced is measured, and, moreover, the ratio between *total* and *external* light is more constant.

The lower carbon should be invariably of less section than the upper carbon.

Further, when producing the light by a short arc, which it is always advisable to do, the lower carbon should be *natural* carbon. Coppering the carbon is advisable under all circumstances. Artificial as well as natural carbons appear to be very little hygroscopic, a great fortune for damp climates like India during the monsoons.

When the arc is long, the flame by combustion of the carbons is large.

This appears to be due to the fact that for a long arc the vacuum formed round the carbon points by expansion of the air by heat is less complete than in an arc of shorter length.

The consumption of the carbon points is due more to combustion than to disintegration.

The incandescent part of the carbon points has so much more intensity of light than the flame that the latter causes a shadow.

The hissing noise produced by the electric arc is, I believe, due to the formation of a vacuum round the incandescent carbon points.

The noise is much stronger in a short than in a long arc. It may also be due in part to the disintegration of the carbon points. The noise of the electric light in a quiet room is simply unbearable. This speaks only *against* the use of the electric light for domestic purposes.

There can be no doubt that one length of arc is best under given circumstances, considering both the intensity and regularity of the light.

The light permanently decreases with length of arc, hence the arc should be made as short as possible. This would, however, be bad for the constancy of the light, and may also spoil the dynamo-electric machine. Hence adjust the commutator by turning the brushes in the direction of the rotation until only small sparks are observed.

If this is impossible make the arc longer by lessening the tension of the spring.

In this manner the best length of arc can be experimentally found.

This would give the best tension of the spring at the starting point. Now let the dynamo-electric machine run for several hours, and make the same experiments, when the best tension of the spring will be found somewhat less. Take the mean of the two tensions and fix the micrometer screw.

#### *Proportionality of light and current—*

Although the light produced in the arc must be very nearly proportional to the total energy consumed in the arc (minus the energy expended in giving the disintegrated carbon particles velocity), the resistance of the arc decreasing with increase of current, it follows that the light *cannot* be proportional to the square of the current.

If we make the highly probable supposition that the resistance of an arc of constant length is inversely proportional to the current which passes through, then the light produced would be proportional to the current.

This appears to be the case.

The conduction of the arc appears to be due to two causes, rarefied air and carbon particles flying in both directions.

Both causes would point towards an *inverse* proportionality between current and resistance of arc.

There are many other novel points of great interest to be discussed, and many more practical and scientific results, I have no doubt could be

elucidated from my experiments, but unfortunately, I must conclude here, since I have to start for India in a few days.

The completion of the results shall, however, be given in my final report which is in preparation.

3.—*On new species of the Genus Plectopylis of the family Helicidæ.*—*By* LIEUT.-COL. H. H. GODWIN-AUSTEN, F. R. G. S., F. Z. S.

(Abstract.)

In this paper the author describes three new species:—one (*Helix (Plectopylis) brachydiscus*) from Tenasserim among a collection of shells made by Mr. O. Limborg, of which a list is being prepared; the other two (*Helix (Plectopylis) Oglei* and *Helix (Plectopylis) brahma*) from Eastern Assam.

The paper will be published in the Journal, Part II, with a plate.

4.—*Hemiptera from Upper Tenasserim.*—*By* W. L. DISTANT. *Communicated by* J. WOOD-MASON.

(Abstract.)

The author in this paper enumerates and describes the *Hemiptera*, collected by Mr. Ossian Limborg in the district east of Moulmein, Tenasserim, and placed in his hands for determination by Mr. Wood-Mason. Among the insects described, the following are new species, *Sminthus marginellus*, *Platyplema insignis*, and *Hueshys thoracica*.

The paper will be published, with plate, in the Journal, Part II.

5.—*Statement of Earthquakes that occurred during 1878, in the Province of Assam.*—*Communicated by the* CHIEF COMMISSIONER OF ASSAM.

This paper has been received from Mr. H. F. Blanford in continuation of former lists, and will be published in the Journal, Part II.

6.—*Addenda to further notes on Kálidása.*—*By* M. A. GRIERSON, C. S.

(Abstract.)

This paper consists of extracts freely translated from the *Bhoja Prabandha*, a work which contains various anecdotes concerning the court of King Bhoja, related by one Vallála. The work has been edited by Paṇḍit Jíbánanda Vidyasagara of Calcutta. Only three of the most interesting anecdotes are given in the paper. The first narrates how Kálidása introduced himself to the king's notice by an ingenious explanation of an apparently unreasonable act of liberality on the part of the king. The king once presented a certain poet Sankara with 12 lakhs of Rupees, which roused the jealousy of the other courtiers; but Kálidása pacified them by the

remark that of the twelve lakhs only *one* was given to the poets, but the eleven others to the 11 Rudras, who are the visible forms of the god Sankara or Siva. On another occasion when some paṇḍits who were skilled in the Vedas, but no adepts in verse-making, were at their wit's end to complete a couplet, with which they wished to ingratiate themselves with the king, Kálidása supplied the rest. The third anecdote illustrates the great ascendancy which the poet Kálidása had gained over the king's mind; so that the king did not dare to remove him from his court, although he was greatly dissatisfied with his dissolute mode of life, wherein he was supported by his queen, and although his courtiers contrived by an intrigue to get Kálidása turned away, the king remained inconsolable, until he had succeeded in re-discovering and bringing back Kálidása, who henceforth stood higher than before in the king's favour.

7.—*On the Norwegian Taters, their language and its relation to Hindi.*  
—By Dr. SUNDBERG.

(Abstract.)

The Taters are the gipsies of Norway. An account of them has been published by Mr. Eilert Sundt in his work "Beretning om Fante-eller Landstrygerfolket i Norge." "The notices of them in the present paper are principally taken from it. The name "Tater" has been identified with *Tatar* ततार. Dr Sundberg suggests a new derivation, from *ṭha-ṭhiár* (a brazier; Hindi *ṭhaṭher*); because one of their occupations is working in brass and other metals. Though outwardly professing the religion of Norway, they really have their own religion; they worship the moon, and call their god *Dundra*, which Dr. Sundberg identifies with *Devendra* देवेन्द्र or the god Indra. It used to be a practice among them to tie a stone round their neck and drown themselves when they thought they had lived long enough. They state their original home to have been the city of *Assas* in *Assaria* which has been identified with Assam; and its aboriginal tribe of the *Doms* is said to have given to their language its name *Romani*. Dr. Sundberg adverts to a story of the Persian poet Firdusi, that the king Behramgur of Persia requested king Kanodsche (Kanouj) of India to send him some musicians; and that the latter sent 12,000 musicians and dancing girls. These are said to have spread all over Europe and are the gipsies, Tater etc.; and Dr. Sundberg points out that in the Punjab the musicians, who accompany nautch-girls, are called *Dom*. There is a small vocabulary of about 800 words added to Mr. Sundt's book, from which Dr. Sundberg gives a few examples of words of apparently Hindi origin; *e. g.*, *jana* to know, *jido* living, *ka* to eat, *kalo* black, *lon* salt, *meros* mine, *pani* water, *pansh* five, *per* belly, *pi* drink, *baro* great, *bersh* rain, *besha* to sit, *brasha* to rain, *de* to give, *deros* thy, *dikka* to see, *dives* day, *dui* two, *ratti* night, etc. There are also a few Russian and Finnish words which



are explained by the Tatars having come to Norway through Russia and Finland. In Norway they are said to have first appeared in the 16th century.

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LIBRARY.

The following additions have been made to the Library since the Meeting held in February last.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR APRIL, 1879.

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The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd instant, at 9 P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed :—

The following presentations were announced—

1. From E. T. Atkinson, Esq., Statistical, Descriptive and Historical account of the Bijnor District,—by H. Conybeare, B. C. S., edited by E. T. Atkinson, Esq., B. A.
2. From E. Thomas, Esq., F. R. S., a copy of his paper,—On the Position of Women in the East in olden time.
3. From the Madras Government,—Index to sixty-two MS. volumes deposited in the Government Oriental MS. Library.
4. From the Chandernagore Pustakágár,—Report on the Chandernagore Pustakágár.
5. From Messrs. L. Schwendler and R. S. Brough, Instructions for Testing Lines, Batteries and Instruments ; and Guide to the Technical Arrangement of Telegraph Offices in India, Vol. II.
6. From the India Office Library, Codices Indici Bibliothecæ Regiæ Havniensis.
7. From Commander A. D. Taylor, Superintendent of Marine Surveys, Chart of Ratnagiri.

The following gentlemen, duly proposed and seconded at the last meeting, were balloted for and elected Ordinary Members—

The Right Rev. the Lord Bishop of Calcutta.

A. C. Lyall, Esq., C. S. (re-elected).

Babu R. Saran Dass, M. A.

The following are candidates for ballot at the next meeting—

J. W. Muir, Esq., c. s., proposed by H. Rivett-Carnac, Esq., c. i. e., seconded by Captain J. Waterhouse.

J. Schroder, Esq., proposed by Dr. A. F. R. Hoernle, seconded by Captain J. Waterhouse.

A. Smidt, Esq., proposed by Dr. A. F. R. Hoernle, seconded by Captain J. Waterhouse.

C. J. Sheridan, Esq., c. e., proposed by H. Rivett-Carnac, Esq., c. i. e., seconded by Captain J. Waterhouse.

The SECRETARY announced that Mr. W. Mackay had intimated his desire to withdraw from the Society.

The SECRETARY reported that J. Westland, Esq., had been appointed a member of the Finance Committee.

The SECRETARY reported that H. H. the Lieutenant-Governor of Bengal had been pleased to appoint the President and Natural History Secretary of the Society to be *ex-officio* Members of the Committee of Management of the Zoological Garden at Alipore.

The SECRETARY reported that 63 pieces of stone sculpture, brought from Gaya by Dr. Rájendralála Mitra, c. i. e., had been transferred to the Indian Museum under the provisions of Section 12, Act XXII of 1876.

The following is a list of the stones :

Nos. 1 & 2. Impressions of human foot.

3. A column.

4. A standing figure of Padmapáni.

5. A model of a native Temple.

6—9. Copings of Asoka rails (two with inscriptions).

10—19. Bases of Pillars.

20. A Lintel.

21—29. Chaityas of various sizes.

30, 31, 32. Asoka rail-bars.

33—37. Friezes, with rows of human figures.

38—61. Pinnacles of Chaityas.

62 & 63. Bricks from one of the radiating arches in the Buddha Gaya Temple.

The SECRETARY reported the purchase of 38 silver coins out of a collection submitted to the Society under the Treasure Trove Act. Dr. Rá-

jendralála Mitra, c. i. e., had kindly examined them, and made the following notes upon them :

“ The collection comprises 126 coins, representing two of the later Pathán Sovereigns of Delhi, and four of Bengal. The former include Sher Sháh and Islám Sháh, and the latter Naçrat Sháh, Hussain Sháh, Muhammad Sháh, and Sikandar Sháh. The bulk of the trove is made up of the coins of the two Delhi emperors, and includes several varieties. I have selected for the Society the following 38 coins, viz. :—

No.

1. Sher Sháh. Circular area on both sides, and Nágari name on the margin. date H. 949, wgt. 174 grains. No. 179 of Thomas' Pathán Coins.
2. Ditto H. 949. C. wgt. 172 grs New.
3. Ditto var. H. 949. „ 169 grs., not figured by Thomas
4. Ditto H. 940. „ 174 grs. ditto
5. Ditto H. 948. „ 175 grs. ditto
6. Ditto, double-line square area. wgt. 171 grs. New.
7. Ditto, single-line square area. H. 914 „ 167 grs. New.
8. Ditto, single-line circular area. H. 949. „ 168 grs.
9. Ditto ditto ditto. H. 950. „ 168 grs.
10. Ditto ditto ditto. H. 951. „ 170 grs. Figured in T. P. Coins, 348a.
11. Ditto, double-line circular area, small size, H. 949. wgt. 169. grs.
12. Ditto, single-line square area H. 946. „ 170 grs.
13. Ditto ditto ditto H. 948. „ 170 grs.
14. Ditto ditto ditto H. 949. „ 173 grs.
15. Ditto ditto ditto H. 951. „ 171 grs.
16. Ditto ditto ditto H. 947. „ 170 grs., new.
17. Ditto ditto ditto H. 948. „ 169 grs., new.
18. Ditto ditto ditto H. 951. „ 170 grs., new.
19. Ditto ditto ditto H. 952. „ 170 grs., new.
20. Islám Sháh, son of Sher Sháh, small size H. 951.
21. Ditto ditto ditto H. 952.
22. Ditto ditto ditto H. 953.
23. Ditto ditto ditto H. 954.
24. Ditto ditto ditto H. 955.
25. Ditto ditto ditto H. 956.
26. Ditto ditto ditto H. 957.
27. Ditto ditto ditto H. 959.
28. Ditto ditto ditto H. 960.
29. Ditto ditto large size H. 954.

} all these  
are of one  
type.

} Type of 344  
of Thomas.

30. Islám Sháh, son of Sher Sháh, large size, H. 955.
31. Ditto                      ditto              ditto              H. 956.
32. Ditto                      ditto              ditto              H. 958.
33. Ditto                      ditto              ditto              H. 959.
34. Ditto                      ditto              ditto              H. 960.
35. Muhammad Sháh, with name in Nágari, no date, new.
36. Sultán Jalál-uddin Muhammad Sháh, no Nágari, no date.
37. Bahádur Sháh, son of Muhammad Sháh, with name in Nágari.
38. Ditto                      ditto              ditto.

"No. 20 is worthy of special note, as it contains a date which cannot be reconciled with the history of Islám Sháh. The *Tarikh Daudi*, quoting the *Tárikh Akbar Sháhí*, says, "when Sher Sháh rendered up his life to the angel of death in Kalinjar, Jalál Khán, his youngest son, was in the town of Rewán, in the province of Bhata, and his eldest son 'Adíl Khán, the heir-apparent, in the fort of Ranthor (Ranthambhor). The nobles perceived that 'Adil Khán would be unable to arrive with speed, and as the State required a head, they despatched a person to summon Jalál Khán, who was nearer. He reached Kalinjar in five days, and, by the assistance of 'Isa Hajjáb and other grandees, was raised to the throne near the fort of Kalinjar, on the 15th of the month Rabi-ul-awwal, 952 A. H. (25th May, 1545, A. D.) He assumed the title of Islám Sháh, and this verse was engraved on his seal :

"The world through the favour of the Almighty, has been rendered happy,  
Since Islám Sháh, the son of Sher Sháh, has become king."\*

"If this record be right, Islám must be accepted to have succeeded Sher Sháh in the middle of 952, immediately after the death of his father. How comes it that we have coins bearing date 951, and describing him as a Sultán, son of Sher Sháh? In Mr. Thomas' excellent monograph of the Pathán Kings of Delhi, mention is made of a coin of Islám Sháh bearing date Ranthambar 951 H., and the type of that coin is the same with that of the above list, but the inconsistency in the date has not been noticed. It is impossible that the father and the son could reign at the same time, unless a revolt of some kind be admitted, and such a revolt or rivalry for the empire between the father and the son has nowhere been mentioned by Muhammadan writers. The son, acting in subordination to the father, would have struck the rupees in his father's, and not in his own, name. Moreover he was not the rightful heir, and could not succeed except by superseding his eldest brother. My own reading of No. 20 I accept with diffidence, but Mr. Thomas' unrivalled knowledge of Indian numismatics and Semitic palæography leaves no room for doubt that the reading is cor-

\* *Apud* Elliot's *Muhammadan Historians*, IV, p. 478.

rect, and the only solution that I can offer of the difficulty is that the second son was striving for the empire even from before the death of his father, and was not only in open revolt, but had gone the length of proclaiming himself the Sultán, and of putting in circulation coins bearing his name a year before his father's death, and that the Muhammadan historians have glossed over this part of his career. The only objection to this solution would be the tender age of the youth, but that would be removed if it be assumed that he had been set up by some disaffected grandees of his father's court."

The SECRETARY reported that, with the consent of the Subscribers, the sum of Rs. 273-7-0, balance of the Stoliczka Memorial Fund, had been transferred to the Asiatic Society's Servants' Pension Fund.

The SECRETARY read the following letter from Prof. J. de Goeje, dated 20th January, 1879, requesting help in obtaining subscribers for the publication of the Great Arabic Annals of Tabari, and said that he would be glad to receive the names of members who had already subscribed or wished to subscribe.

"Permit me to explain why I take the liberty of addressing you. In 1875 a consortium of Orientalists resolved to undertake the publication of the great Arabic annals of Tabari. Though there was not known a single manuscript of the whole work, still several libraries possessed parts of it, from which it would be possible to restore the text. To get these volumes copied or collated, a relatively considerable sum of money was required, and a good number of subscribers was thought necessary to cover the costs of printing. I addressed myself for support to many promoters of science and had not bad luck. I had great expectations from India and was not disappointed. Dr. Blochmann wrote to me that it would be easy for him to procure me 60 subscribers, and Dr. Rájendralála Mitra told Prof. Sprenger in a letter of earlier date, that Dr. Blochmann had already a dozen names on his list, and that he himself had a few more. Now by the illness and subsequent death of Dr. Blochmann, this most promising correspondence has been broken off, and I never received the list of subscribers, which Dr. Blochmann had given himself so much trouble to collect. I was at a loss to whom I might address myself for information, when Mr. A. Grote emboldened me to appeal to your kindness. So now I venture to recommend to you the interests of our undertaking, and to ask for your help in promoting them."

"The first half volume of Tabari is nearly printed and will be published within two months."

Dr. HOERNLE exhibited facsimiles of three inscriptions and statuette sent by Mr. Rivett-Carnac, and read a note by Dr. R. Mitra on the same. The inscriptions are incomplete and of not much value. They are intended for Sanskrit, but both the language and orthography are corrupt. The first, of seven lines, is from Bhojpur, near Fatehgarh. It is now built into a wall, face inwards; but this is not its original place for it was put up to record the making of the approaches to a bridge, at some locality not named. According to the record, this was done during the reign of Sultan Sikandar, son of Behlul Lodi, by one Buddhana, son of Bajbal Kuradi, of the race of Bahlim. It also mentions one, Khan Daudan. The names cannot be identified. The date is Samvat 1545 (A. D. 1491). The second, of two lines, in Kutila characters, partly illegible, contains the names *Vāsava Dāmudaka* (for *Damodara*?). It is from a stone at Kanauj, apparently the top of a pillar; without date. The third, from the remains of a sandstone figure, containing only ten Sanskrit letters and a monogram, is illegible. Date Samvat 1580 (A. D. 1523). The statuette is a small black sitting figure. The pose according to Dr. Mitra is that of Buddha in ecstasy, and is well known. Mr. Rivett-Carnac takes it to be a Jain figure. The symbol of the hooded snake engraved on the base, and the black colour of the figure, perhaps, indicate it to represent Parsvanāth. There is an inscription in modern Nāgari all round the base, of which, however, only the date Samvat 1548 (A. D. 1491), the 6th of the waxing moon in the month of Vaisākha, and the words *pranamati sadgurum*, i. e. "he salutes the true guru" can be made out.

Dr. HOERNLE read the following description of the gold coins found by Mr. W. Simpson in the Ahin Posh Tope at Jalalábád, exhibited at the last meeting.

There are altogether 20 coins, two (Nos. IX and XIII) contained in a small gold reliquary, the other 18 loose. They are all of gold, of small size, about  $\frac{1}{4}$  inch wide, and about 2 drams in weight. They are of two different classes, 3 are Roman, the other 17 Indo-scythian. The latter are of three different reigns, of Kadphises, Kanerki and Hverki. See Plates II and III.

#### I. INDO-SCYTHIAN COINS.

##### A. *Coins of Kadphises.*

There are altogether ten of these; they are of two sorts; (1) such as bear the bust of king Kadphises on the obverse, and a standing human figure on the reverse; (2) such as have the same obverse as the former, but on the reverse bear a human figure standing by the side of a standing bull.

(1.) These again are of two kinds, in some (*a*) the head of the bust is turned to the left; in the others (*b*) it is turned to the right.

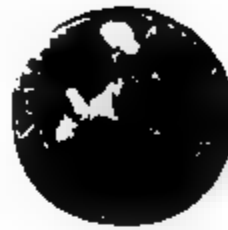
\* It has been decided to have these plates produced in England by the Autotype photo-mechanical process, as being far superior to lithography. Some delay will therefore arise before they can be issued.—ED.



I



**Π**



III



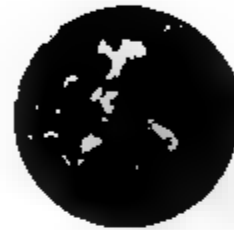
#### IV



**V**



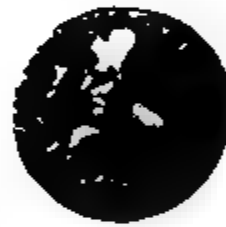
VI



५॥



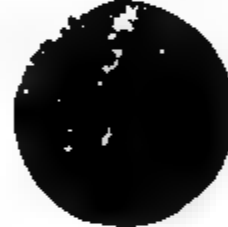
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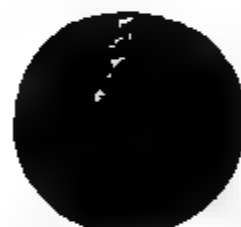
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Σ



## II



XII



XIII



XIV



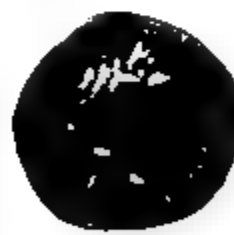
xv



XVI



XVI



XVII



**UX**



GOLD COINS FOUND IN THE AHIN POSH TOPE, JALALABAD.  
(Obverses.)



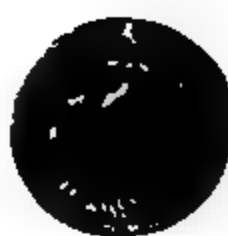




I



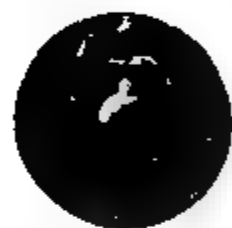
II



III



IV



V



VI



VII



VIII



IX



X



XI



XII



XIII



XIV



XV



XVI



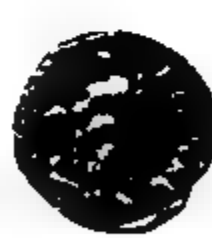
XVII



XVIII



XIX



XX

GOLD COINS FOUND IN THE AHIN POSH TOPE, JAIALABAD.  
(Reverse.)



(a.) Of this kind there are five specimens :

No. I *Obverse*—Figure of king to the front, head turned to the left, with a thick closely cut full-beard (in most specimens so much abraded as to give the appearance of a beardless face,) dressed in a coat and a low Tartar cap with fillets and frontlet, in the right hand a mace or short club, leaning on the shoulder ; monogram (No. 1, on table III, Pl. I.) behind the head ; below the bust and all round it the inscription.

*Reverse*—Naked standing male human figure turned to the front ; head to the right ; apparently leaning back with the left elbow on some invisible support, hid by a skin thrown over the left lower arm ; in the left hand a short club, right hand raised and resting on a spear which is surmounted by a trident and combined half way down the staff with an axe ; hair done in a cone on the top of the head. Monogram double, on right and left (table III, Pl. I. Nos. 2, 3) ; inscription running all round.

No. II. A duplicate of No. I.

No. III. *Obverse*—Like that of No. I, except the head-dress being a high Tartar cap, like those given in Wilson's *Ariana Antiqua*, Pl. X, 7, 8, 13.

*Reverse*—Like that of No. I.

No. IV. and No. V. duplicates of No. III.

(b.) Of this kind there are three specimens :

No. VI. *Obverse*—Bust of king to the front ; head turned to the right ; dressed in Tartar coat and high cap with ordinary fillets and frontlet ; in the right hand a mace carried erect ; monogram behind the head ; inscription below and around the bust.

*Reverse*—Like that of No. I.

Nos. VII, VIII, and IX duplicates of No. VI.

Of Nos. I and II no specimens are given by Wilson in his *Ariana Antiqua*. Nos. I and II are in a good state of preservation ; Nos. VII and VIII are fairly good ; the rest are very much worn ; especially Nos. III and V which are for the most part effaced.

#### *Explanation.*

(1.) *Figures*. Alike on all coins I to VIII ; the bust on the obverse evidently a portrait of king Kadphises ; features Tartar ; very heavy, especially in the lower part of the face. The figure on the reverse very closely resembles that on the reverse of the coins of Kadphises or Kadaphes under Su-Hermaeus. On the latter coins it is a figure of Hercules in the conventional posture, as seen, *e. g.*, in the well-known *Ercole Farnese* in Naples. It is a naked standing Hercules, to the front, slightly reclining on his left elbow ; the lion's skin hanging over the left lower arm, and the Hesperide apple in the left hand ; the right hand resting on his club, the butt end of which is on the ground (see Wilson's *Ariana Antiqua*, 309,

Pl. 5, 8, 9, 10). The same figure is also found on coins of Hverki (see Ed. Thomas' *Jainism*, p. 61, Pl. II, 2). On the present coins the figure is the same, but the attributes of Hercules are exchanged for those of Śiva; his *triśúla* or three-pronged spear (combined with his axe, as in the tridents of Barahat and Gopeshwar, see Wilson's *Ariana Antiqua*, 350), taking the place of the club; his tiger skin (in Indian representations wrapt round the loins, but here thrown over the arm to resemble Hercules) replacing the lion's skin; his noose or the *khinkin* (the object is not quite distinct) the apple, and the spiral coil of hair on his head the curly hair of Hercules.

(2.) Inscription alike on all 8 specimens.

*Obverse*—The legend is in Greek language and Greek characters; on the left ΒΑCΙΑΕΥC οοΗΜο, on the right ΚΑΔΦΙCΗC, below the bust ΜΙΓΑC; *i. e.*, βασιλευc οοημο-καδφισηc μεγαc, *i. e.* "king Hvemo-Kadphises the Great." The word μεγαc has hitherto not been read, though it was already remarked by Wilson (*Ariana Antiqua*, pp. 354) that the lower part of the bust had the appearance of characters. The appearance of letters, indeed, is too unmistakeable to allow them to be taken as only parts of the dress. But owing to the fact that the letters are here cut at a higher elevation than in the rest of the legend, level with the bust itself, they have in most coins suffered so much abrasion as to be almost unrecognisable. There are, however, in the present collection two coins (Nos. I and II) on which the letters are in a sufficiently good state of preservation to permit an attempt at identification. I take them to be *migas*, where 'i' is either a mistake for 'e' or only badly cut. It should be observed (see Wilson's *Ariana Antiqua*, 355—357, Pl. XI) that both on the silver and the copper coins of Kadphises the word *megas* is not only part of the inscription, but occurs precisely in the same place below the bust.

*b. Reverse*—The legend is in the Páli language, and in what has been called the Bactrian or Arian-Páli characters. It must be read from the right to the left; commencing at the top of the left side of the coin. It consists of 33 letters, see Pl. I. table I. The whole, with the exception of the last seven letters, is distinctly visible on coin No. I. The deficiency is supplied by No. II, on which the second half is distinct. By the help of these two specimens, therefore, the whole of the legend can be made out with tolerable certainty. On the others it is more or less imperfect. Nos. III and V are quite useless. On the rest the middle of the legend is generally readable and available for comparison. But though the form of the letters is assured, their value, for the most part, is not so. That of the first eleven is certain; it is *Maharajasa rajadhirajasa*. The next is *sa*; 13 is unknown; 14 and 15 are *loga*;

Table I.—ARIAN-PALI CHARACTERS.

| No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 | 109 | 110 | 111 | 112 | 113 | 114 | 115 | 116 | 117 | 118 | 119 | 120 | 121 | 122 | 123 | 124 | 125 | 126 | 127 | 128 | 129 | 130 | 131 | 132 | 133 | 134 | 135 | 136 | 137 | 138 | 139 | 140 | 141 | 142 | 143 | 144 | 145 | 146 | 147 | 148 | 149 | 150 | 151 | 152 | 153 | 154 | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | 187 | 188 | 189 | 190 | 191 | 192 | 193 | 194 | 195 | 196 | 197 | 198 | 199 | 200 | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | 210 | 211 | 212 | 213 | 214 | 215 | 216 | 217 | 218 | 219 | 220 | 221 | 222 | 223 | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | 233 | 234 | 235 | 236 | 237 | 238 | 239 | 240 | 241 | 242 | 243 | 244 | 245 | 246 | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | 256 | 257 | 258 | 259 | 260 | 261 | 262 | 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | 271 | 272 | 273 | 274 | 275 | 276 | 277 | 278 | 279 | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 | 288 | 289 | 290 | 291 | 292 | 293 | 294 | 295 | 296 | 297 | 298 | 299 | 300 | 301 | 302 | 303 | 304 | 305 | 306 | 307 | 308 | 309 | 310 | 311 | 312 | 313 | 314 | 315 | 316 | 317 | 318 | 319 | 320 | 321 | 322 | 323 | 324 | 325 | 326 | 327 | 328 | 329 | 330 | 331 | 332 | 333 | 334 | 335 | 336 | 337 | 338 | 339 | 340 | 341 | 342 | 343 | 344 | 345 | 346 | 347 | 348 | 349 | 350 | 351 | 352 | 353 | 354 | 355 | 356 | 357 | 358 | 359 | 360 | 361 | 362 | 363 | 364 | 365 | 366 | 367 | 368 | 369 | 370 | 371 | 372 | 373 | 374 | 375 | 376 | 377 | 378 | 379 | 380 | 381 | 382 | 383 | 384 | 385 | 386 | 387 | 388 | 389 | 390 | 391 | 392 | 393 | 394 | 395 | 396 | 397 | 398 | 399 | 400 | 401 | 402 | 403 | 404 | 405 | 406 | 407 | 408 | 409 | 410 | 411 | 412 | 413 | 414 | 415 | 416 | 417 | 418 | 419 | 420 | 421 | 422 | 423 | 424 | 425 | 426 | 427 | 428 | 429 | 430 | 431 | 432 | 433 | 434 | 435 | 436 | 437 | 438 | 439 | 440 | 441 | 442 | 443 | 444 | 445 | 446 | 447 | 448 | 449 | 450 | 451 | 452 | 453 | 454 | 455 | 456 | 457 | 458 | 459 | 460 | 461 | 462 | 463 | 464 | 465 | 466 | 467 | 468 | 469 | 470 | 471 | 472 | 473 | 474 | 475 | 476 | 477 | 478 | 479 | 480 | 481 | 482 | 483 | 484 | 485 | 486 | 487 | 488 | 489 | 490 | 491 | 492 | 493 | 494 | 495 | 496 | 497 | 498 | 499 | 500 | 501 | 502 | 503 | 504 | 505 | 506 | 507 | 508 | 509 | 510 | 511 | 512 | 513 | 514 | 515 | 516 | 517 | 518 | 519 | 520 | 521 | 522 | 523 | 524 | 525 | 526 | 527 | 528 | 529 | 530 | 531 | 532 | 533 | 534 | 535 | 536 | 537 | 538 | 539 | 540 | 541 | 542 | 543 | 544 | 545 | 546 | 547 | 548 | 549 | 550 | 551 | 552 | 553 | 554 | 555 | 556 | 557 | 558 | 559 | 560 | 561 | 562 | 563 | 564 | 565 | 566 | 567 | 568 | 569 | 570 | 571 | 572 | 573 | 574 | 575 | 576 | 577 | 578 | 579 | 580 | 581 | 582 | 583 | 584 | 585 | 586 | 587 | 588 | 589 | 590 | 591 | 592 | 593 | 594 | 595 | 596 | 597 | 598 | 599 | 600 | 601 | 602 | 603 | 604 | 605 | 606 | 607 | 608 | 609 | 610 | 611 | 612 | 613 | 614 | 615 | 616 | 617 | 618 | 619 | 620 | 621 | 622 | 623 | 624 | 625 | 626 | 627 | 628 | 629 | 630 | 631 | 632 | 633 | 634 | 635 | 636 | 637 | 638 | 639 | 640 | 641 | 642 | 643 | 644 | 645 | 646 | 647 | 648 | 649 | 650 | 651 | 652 | 653 | 654 | 655 | 656 | 657 | 658 | 659 | 660 | 661 | 662 | 663 | 664 | 665 | 666 | 667 | 668 | 669 | 670 | 671 | 672 | 673 | 674 | 675 | 676 | 677 | 678 | 679 | 680 | 681 | 682 | 683 | 684 | 685 | 686 | 687 | 688 | 689 | 690 | 691 | 692 | 693 | 694 | 695 | 696 | 697 | 698 | 699 | 700 | 701 | 702 | 703 | 704 | 705 | 706 | 707 | 708 | 709 | 710 | 711 | 712 | 713 | 714 | 715 | 716 | 717 | 718 | 719 | 720 | 721 | 722 | 723 | 724 | 725 | 726 | 727 | 728 | 729 | 730 | 731 | 732 | 733 | 734 | 735 | 736 | 737 | 738 | 739 | 740 | 741 | 742 | 743 | 744 | 745 | 746 | 747 | 748 | 749 | 750 | 751 | 752 | 753 | 754 | 755 | 756 | 757 | 758 | 759 | 760 | 761 | 762 | 763 | 764 | 765 | 766 | 767 | 768 | 769 | 770 | 771 | 772 | 773 | 774 | 775 | 776 | 777 | 778 | 779 | 780 | 781 | 782 | 783 | 784 | 785 | 786 | 787 | 788 | 789 | 790 | 791 | 792 | 793 | 794 | 795 | 796 | 797 | 798 | 799 | 800 | 801 | 802 | 803 | 804 | 805 | 806 | 807 | 808 | 809 | 810 | 811 | 812 | 813 | 814 | 815 | 816 | 817 | 818 | 819 | 820 | 821 | 822 | 823 | 824 | 825 | 826 | 827 | 828 | 829 | 830 | 831 | 832 | 833 | 834 | 835 | 836 | 837 | 838 | 839 | 840 | 841 | 842 | 843 | 844 | 845 | 846 | 847 | 848 | 849 | 850 | 851 | 852 | 853 | 854 | 855 | 856 | 857 | 858 | 859 | 860 | 861 | 862 | 863 | 864 | 865 | 866 | 867 | 868 | 869 | 870 | 871 | 872 | 873 | 874 | 875 | 876 | 877 | 878 | 879 | 880 | 881 | 882 | 883 | 884 | 885 | 886 | 887 | 888 | 889 | 890 | 891 | 892 | 893 | 894 | 895 | 896 | 897 | 898 | 899 | 900 | 901 | 902 | 903 | 904 | 905 | 906 | 907 | 908 | 909 | 910 | 911 | 912 | 913 | 914 | 915 | 916 | 917 | 918 | 919 | 920 | 921 | 922 | 923 | 924 | 925 | 926 | 927 | 928 | 929 | 930 | 931 | 932 | 933 | 934 | 935 | 936 | 937 | 938 | 939 | 940 | 941 | 942 | 943 | 944 | 945 | 946 | 947 | 948 | 949 | 950 | 951 | 952 | 953 | 954 | 955 | 956 | 957 | 958 | 959 | 960 | 961 | 962 | 963 | 964 | 965 | 966 | 967 | 968 | 969 | 970 | 971 | 972 | 973 | 974 | 975 | 976 | 977 | 978 | 979 | 980 | 981 | 982 | 983 | 984 | 985 | 986 | 987 | 988 | 989 | 990 | 991 | 992 | 993 | 994 | 995 | 996 | 997 | 998 | 999 | 1000 | 1001 | 1002 | 1003 | 1004 | 1005 | 1006 | 1007 | 1008 | 1009 | 1010 | 1011 | 1012 | 1013 | 1014 | 1015 | 1016 | 1017 | 1018 | 1019 | 1020 | 1021 | 1022 | 1023 | 1024 | 1025 | 1026 | 1027 | 1028 | 1029 | 1030 | 1031 | 1032 | 1033 | 1034 | 1035 | 1036 | 1037 | 1038 | 1039 | 1040 | 1041 | 1042 | 1043 | 1044 | 1045 | 1046 | 1047 | 1048 | 1049 | 1050 | 1051 | 1052 | 1053 | 1054 | 1055 | 1056 | 1057 | 1058 | 1059 | 1060 | 1061 | 1062 | 1063 | 1064 | 1065 | 1066 | 1067 | 1068 | 1069 | 1070 | 1071 | 1072 | 1073 | 1074 | 1075 | 1076 | 1077 | 1078 | 1079 | 1080 | 1081 | 1082 | 1083 | 1084 | 1085 | 1086 | 1087 | 1088 | 1089 | 1090 | 1091 | 1092 | 1093 | 1094 | 1095 | 1096 | 1097 | 1098 | 1099 | 1100 | 1101 | 1102 | 1103 | 1104 | 1105 | 1106 | 1107 | 1108 | 1109 | 1110 | 1111 | 1112 | 1113 | 1114 | 1115 | 1116 | 1117 | 1118 | 1119 | 1120 | 1121 | 1122 | 1123 | 1124 | 1125 | 1126 | 1127 | 1128 | 1129 | 1130 | 1131 | 1132 | 1133 | 1134 | 1135 | 1136 | 1137 | 1138 | 1139 | 1140 | 1141 | 1142 | 1143 | 1144 | 1145 | 1146 | 1147 | 1148 | 1149 | 1150 | 1151 | 1152 | 1153 | 1154 | 1155 | 1156 | 1157 | 1158 | 1159 | 1160 | 1161 | 1162 | 1163 | 1164 | 1165 | 1166 | 1167 | 1168 | 1169 | 1170 | 1171 | 1172 | 1173 | 1174 | 1175 | 1176 | 1177 | 1178 | 1179 | 1180 | 1181 | 1182 | 1183 | 1184 | 1185 | 1186 | 1187 | 1188 | 1189 | 1190 | 1191 | 1192 | 1193 | 1194 | 1195 | 1196 | 1197 | 1198 | 1199 | 1200 | 1201 | 1202 | 1203 | 1204 | 1205 | 1206 | 1207 | 1208 | 1209 | 1210 | 1211 | 1212 | 1213 | 1214 | 1215 | 1216 | 1217 | 1218 | 1219 | 1220 | 1221 | 1222 | 1223 | 1224 | 1225 | 1226 | 1227 | 1228 | 1229 | 1230 | 1231 | 1232 | 1233 | 1234 | 1235 | 1236 | 1237 | 1238 | 1239 | 1240 | 1241 | 1242 | 1243 | 1244 | 1245 | 1246 | 1247 | 1248 | 1249 | 1250 | 1251 | 1252 | 1253 | 1254 | 1255 | 1256 | 1257 | 1258 | 1259 | 1260 | 1261 | 1262 | 1263 | 1264 | 1265 | 1266 | 1267 | 1268 | 1269 | 1270 | 1271 | 1272 | 1273 | 1274 | 1275 | 1276 | 1277 | 1278 | 1279 | 1280 | 1281 | 1282 | 1283 | 1284 | 1285 | 1286 | 1287 | 1288 | 1289 | 1290 | 1291 | 1292 | 1293 | 1294 | 1295 | 1296 | 1297 | 1298 | 1299 | 1300 | 1301 | 1302 | 1303 | 1304 | 1305 | 1306 | 1307 | 1308 | 1309 | 1310 | 1311 | 1312 | 1313 | 1314 | 1315 | 1316 | 1317 | 1318 | 1319 | 1320 | 1321 | 1322 | 1323 | 1324 | 1325 | 1326 | 1327 | 1328 | 1329 | 1330 | 1331 | 1332 | 1333 | 1334 | 1335 | 1336 | 1337 | 1338 | 1339 | 1340 | 1341 | 1342 | 1343 | 1344 | 1345 | 1346 | 1347 | 1348 | 1349 | 1350 | 1351 | 1352 | 1353 | 1354 | 1355 | 1356 | 1357 | 1358 | 1359 | 1360 | 1361 | 1362 | 1363 | 1364 | 1365 | 1366 | 1367 | 1368 | 1369 | 1370 | 1371 | 1372 | 1373 | 1374 | 1375 | 1376 | 1377 | 1378 | 1379 | 1380 | 1381 | 1382 | 1383 | 1384 | 1385 | 1386 | 1387 | 1388 | 1389 | 1390 | 1391 | 1392 | 1393 | 1394 | 1395 | 1396 | 1397 | 1398 | 1399 | 1400 | 1401 | 1402 | 1403 | 1404 | 1405 | 1406 | 1407 | 1408 | 1409 | 1410 | 1411 | 1412 | 1413 | 1414 | 1415 | 1416 | 1417 | 1418 | 1419 | 1420 | 1421 | 1422 | 1423 | 1424 | 1425 | 1426 | 1427 | 1428 | 1429 | 1430 | 1431 | 1432 | 1433 | 1434 | 1435 | 1436 | 1437 | 1438 | 1439 | 1440 | 1441 | 1442 | 1443 | 1444 | 1445 | 1446 | 1447 | 1448 | 1449 | 1450 | 1451 | 1452 | 1453 | 1454 | 1455 | 1456 | 1457 | 1458 | 1459 | 1460 | 1461 | 1462 | 1463 | 1464 | 1465 | 1466 | 1467 | 1468 | 1469 | 1470 | 1471 | 1472 | 1473 | 1474 | 1475 | 1476 | 1477 | 1478 | 1479 | 148 |
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16 is either *i* or *sta*; 17 is unknown; 18 and 19 are *rasa*; 20 and 21 are *mahi*; 22, 23 and 24 are the same as 17, 18 and 19; 25 and 26 appear to be *hima* or *hvima*; 27, 28, 29, and 30 are *Kadphisasa*; 31 is unknown; 32 and 33 are *dara*. There are various helps to determine the probable meaning of the legend. In the first place, it has been found that, as a rule, the Páli legend on the reverse is a more or less accurate translation of that on the obverse. In the present case the legend on the reverse is much too long to be such a translation. But the same legend occurs also on the copper coins of Kadphises which have a much longer Greek inscription, viz., *basileus basileón sôtír megas hímo-Kadphísís*; and it can scarcely be doubtful, that the Páli legend is the equivalent of the longer Greek series (see Wilson's *Ariana Antiqua*, 350). Now *maharajasa rajadhirajasa*, "of the great king, the king of kings" is evidently intended to represent *basileus basileón* "king of kings." The words *hima-kadphisasa* "of Hima-Kadphises" occur in both Páli (letters 25—30) and Greek. The remainder, therefore, of the Páli legend ought to be the equivalent of *megas* and *sôtír*. In the second place, the Páli legend is in the genitive case, which ends in *sa*. The same termination *sa* occurs twice again in letters 19 and 24, which shows that the letters intermediate between *rajadhirajasa* and *hima* (*i. e.*, 12 to 24) consist of two groups, each containing an epithet of king Kadphises. There is a third group of letters (31—33) following Kadphises. It can hardly be doubted that this also contains an epithet of the king. In that case it ought to terminate with *sa*. I have no doubt that it was intended to end so and that the letter was simply omitted for want of space; the letters of the inscription being already packed so closely as to leave no room for an additional one. On coin No. X, letter 16 is similarly omitted. Again the unknown character 30 I take to be *tra*\*; for *r* is marked by adding a stroke to the right foot of the letter (see Cunningham, *Corpus Inscript. Ind.*, 49), which, without this stroke, is the usual character for *t*. The whole group, then, must be read *tradarasa* or *tráddárasa*, "of the saviour," the regular Páli or Apabhramsa-prákrit equivalent of the Sanskrit *trátuh* (see Hema Chandra 3, 44) and the Greek *sôtír*. This reading is confirmed by the fact that the Arian Páli as well as the Ap. Prák. like to retain an *r* (see Cunningham C. I. I., 43 and H. Ch. 4, 398). The Greek *sôtír* being thus accounted for, the remaining Greek word *megas* ought to be the equivalent of the remaining two groups. The simple Páli translation of *megas*, as it

\* Since writing the above, I have discovered in the Shahbázgarhi rock inscription (towards the end of the IIIrd edict, see Cunningham C. I. I., Pl. I) and on some of the coins of Hermaeus (see Wilson A. A., Pls. IV and V) a character for *tra*, very closely resembling this one.

occurs on other coins, is *mahatasa* (= Prák. *mahantassa* or *mahattassa*). Here, of course, it cannot be taken as translated, but is paraphrased and expanded. The unknown letter 22 resembles the Arian Páli character for *ṣ*; but there is a curve added to the right foot, which may indicate the combination of another consonant with *ṣ*; such combinations being not uncommon in Arian Páli (see Cunningham C. I. I., 49). Now the only possible conjunct here is *ṣv*; so that the whole group (20—24) must be read *mahiṣvarasa*, which I take to stand for the Sanskrit *maheṣvarasya* “of the great lord,” with *i* for *e*, as in the Prákrit *devimdo* for Sanskrit *devendraḥ* (see H. Ch., 3, 162). Again the group (22—24) *ṣvarasa* re-occurs in 17—19. The group 14—15 is *loga*. The intermediate letter 16 must therefore be *i*, to give any sense at all. No. 13 is generally valued as *va*, so that the whole group 12—19 would be *savvalogaṣṣvarasa*, which I should take to be equal to the Sanskrit *sarvalokaiṣvarasya* “of the supreme in the whole world.” In this way, this and the other group together would give a fulsome paraphrase of the Greek *megas* “the Great.” The explanation of the last two groups is substantially the same as that given by Thomas in his *Jainism* (p. 59) where, however, the author of it is not mentioned. The word *logaiṣvarasa* is not = Sanskrit *lokeṣvarasya*, as Thomas has it, but is equal to *lokaiṣvarasya*, for Sanskrit *e* would not dissolve into *ai*, whereas *ai* does (see H. Ch., 1, 151, where the very word *aṣariam* for Sanskrit *aiṣvarya* is given as an example). However, the form of 13 in the group is, by no means, the usual form of *v*, as may be seen by a reference to the alphabets in Wilson, Prinsep, and Cunningham. It is doubtful, therefore, whether the correct value has been assigned to it. It looks like a conjunct, the two parts of which somewhat resemble the characters for *g* and *d*, and may therefore be *gda*. In that case, the whole group (12—19) would read *sagdalogaṣṣvarasa* “of the sovereign of the Sagda people.” The Sagdas might then be identified with the Sogdians who are spoken of by the Greek historians as one of the Scythian tribes. It should be also noticed that the letter 25 is not the usual one, as we have it, e. g., in 21. I take it to be a compound consonant, made up of *h* and *v* with the vowel *i* and to be the equivalent of *hvi*, so that the whole group 25, 26 must be read *hvíma*. This corresponds exactly to the Greek *οοίμο* (*ooímo*). That the Greek *o* may stand for *v* is shown by *oado* for *váto* (see Wilson, A. A., 362), and that it may also represent the aspirate *h*, by *ooírki* for *hvirki* (see p. 134). The latter is the name of the king who is otherwise known as *huvi shka*. Here *huvi* is rendered in Greek by *οοη* (*ooi*), the same as in *οοίμο* (*ooíma*). Now *η* is rendered in the Arian-Páli of the present coin by the vowel sign for *i*. Hence the accompanying Arian-Páli consonant must represent the Greek *oo*, and must be equivalent to *huv* or rather *hv*.—Of the concluding group of the Páli legend, I am not



aware of any explanation having been given hitherto. Wilson (A. A., 258), indeed, notices the true interpretation which I have given above, but only to reject it.

(2.) Of this kind there is only one specimen.

No. X. *Obverse*—Exactly like that of No. I. On the back of the head very long hair, flowing down to the shoulders, is distinctly visible, reminding one somewhat of the long hair of the modern Afghans.

*Reverse*—The figure principally differs from that on the reverse of No. I by the addition of a bull which stands behind the human figure. The latter closely resembles that of No. I in general posture; the left elbow on which it reclines is supported on the hump of the bull; the right hand, as before, resting on a three-pronged spear which, however, is only half as long as in No. I and rests with its lower end on the back of the bull; it also wants the axe. But the tiger's skin is absent and the left hand is empty. Instead of the coil of hair, the head is covered with a bell-shaped helmet or bonnet, reaching to the shoulders behind, surmounted by three prongs or rays, and with a lobe on each side. The face is turned to the front, not to the right, as in No. I. A chaplet of balls is hanging over the left shoulder and reaches down to the hips. The figure is naked and is that of a woman, as shown by the general configuration of the body. The bull is standing with its head seen on the left side of the woman; his horns arranged so as to form a regular crescent; a cloth is thrown over his back so as to nearly reach to the ground. There is only one monogram (No. 5 on table III), not two as on No. I; and it is the right side one of No. I, which is here on the left side of the coin (the right of the figure). Inscription round the whole circumference.

What distinguishes this coin from all the others of the Indo-Scythian class is the superior sharpness, a miniature-like clearness, with which both the figures and the inscriptions are cut. It is also in a very fair state of preservation; only a small part of the rim being worn away on one side.

#### *Explanation.*

(a.) *Figures.* That on the *obverse* requires no explanation, being the same as on No. I; but instead of the mace there is a short club, and the fillets are Sassanian.

*Reverse*—The attributes are those of Śiva; his vehicle, the white bull or nandi; his *triśúla*; his chaplet of skulls, the *munda málá*; the bell-shaped head-dress perhaps signifies the Ganges, flowing from his head. As the figure is that of a woman, it is probably meant for Parvati, the wife or female form of Śiva. On some coins the figure is said to be hermaprodite (see Wilson's *Ariana Antiqua*, 351). In that case it would repre-

sent *arddhanarīṣvara*, the half male, half female form of Śiva. "The housings of the bull are such as may still be seen upon the Indian bull that is led about by mendicant Jangamas" (see Wilson's *Ariana Antiqua*, 351).

(b.) *Inscriptions.* *Obverse*—The legend is the same as in No. I, but the form of some of the Greek letters is cruder as may be seen by a reference to Pl. I, table II.

*Reverse*—The legend is identical with that of No. I, but there is a slight difference in the tracing of some of the letters (4, 7, 10, 12, 15, 32), as will be seen by a reference to Pl. I, table I. In 13 and 15 the relative position of the loop is exactly reversed. In 4, 7, 10, 32 an ornamental stroke is added to the foot of the letter. 16 is entirely omitted. The last and the first letters of the legend are, for want of space, made to run into each other; thus fully accounting for the omission of the final *sa*.

### B. *Coins of Kanerki.*

Of these there are altogether six. Among them there are only two that are quite alike, so that there are five different kinds according to the form of the figure on the reverse.

1. No. XI. One specimen only. *Obverse*—Standing figure of the king to the front, head to the right, with long straight full-beard, dressed in a close-fitting frockcoat or tunic, closed in front, in *pajamas*, and clumsy (boots or) shoes, much broader at the toes than at the heels, also in a mantle thrown over the shoulders and held by a button in front, the sleeves of which are seen flying out on both sides behind the arms. (Wilson, *Ariana Antiqua*, p. 358, takes the latter to be a bow carried on the back; but on none of the present specimens does it at all look so; he was misled by the outline of the sleeves being drawn too straight and stiff in some cases). On the head there is a crown or helmet, consisting of a parallel trapezium, with the narrower side below, with the royal fillet attached, and surmounted by a dome and above it a trident. It is probably the same crown as in No. XVII, though it is too much abraded to clearly distinguish minor points of detail. The right hand, pointing downwards, holds a hook or *ankusa* over a very low object, standing beside the right foot; the left hand is raised and rests on a spear. Attached to the waist-band (only distinguishable on No. XII) there is a short sword, protruding on the left side. The whole figure closely resembles one on some coins of Kadphises of which there is no specimen in the present collection, but drawings of which may be seen in Wilson's *Ariana Antiqua*, Pl. X, 12, 14, 21. [They differ in the features and beard; in those of Kadphises there is a high Tartar cap on the head (as, however, also in Nos. XII—XIV);

the tunic is worn open in front, so as to allow the tie-strings of the *pajamas* to be distinctly seen ; the sword is wanting ; there is added a monogram (the same which in the present coins appears on the reverse) ; a mace or short club replaces the spear, but not carried in the (left) hand which is placed on the hip ; a trident and axe (combined as in No. I) replace the hook, but again not carried in the (right) hand which is empty and points downwards to the unknown object.] Inscription on both sides, but not below the feet and above the head ; between the feet, along the rim, a series of dots.

*Reverse*—Standing male figure with large pendent ears and a large tuft on the top of the head, dressed in a long robe reaching to below the knees ; parts of the dress (apparently a neckerchief) are hanging over both arms which are in elbow-position, the right one turned inwards with its hand on the breast, the left turned outwards with its hand holding some round object (a lotus) ; a circular nimbus round the head, another elliptical one round the rest of the body, both meeting at tangents behind the neck ; monogram on the right of the coin (No. 6 on Pl. I, table III) ; inscription on the left ; a series of dots all round the rim.

This coin is well executed and in a very fair state of preservation. It appears to be unique, as being the only *gold* piece found hitherto with the figure of Buddha on the reverse, and the *only one* on which the name of Buddha is distinctly *legible*. All those known hitherto are “*copper* pieces of imperfect execution, whose legends are absolutely chaotic in the forms and arrangements of the Greek letters,” (see Ed. Thomas’ *Jainism*, p. 79.)

*Explanation.* (a.) *Obverse*—Figure. Likeness of Kanerki ; head and features easily distinguishable from those of Kadphises. Head of the latter thick and broad, of the former more elongated ; features here sharp, there heavy ; beard long and straight here, there short and thick. The low object at the foot of the king is very like a miniature of the large fire-altar, represented on the reverse of the Sassanian coins (see Wilson’s *Ariana Antiqua*, Pl. XV, 3, XVII, 13, 14). Hence the king is generally supposed to be represented in the act of sacrificing on a Mithraic altar.

*Inscription.* In the North-western or Arian Páli language and in Greek characters ; on the left of the coin PAoNANo PAo KA, on the right NHPKI KoPANo, *i. e.*, *paonano rao kanerki korano*. The corresponding legend on No. XIV is βασιλευς βασιλεων κανηρκου ; and it cannot be doubtful that the Páli legend is but a translation of the Greek one. *Raonano rao*, therefore, must be the equivalent of *basileos basileón* and mean “king of kings.” And, in fact, *ráo* is the regular Prákrit nominative singular of *rájá* king (see Siñha Rájá, fol. 20, H. Ch., 3, 49, 56). It still occurs as a title of Hindu princes. Again rááṇána (or rááṇáṇam) is the regular Prákrit genitive plural “of kings” (see H. Ch. 3, 56). Strictly

the Greek *παοvavo* represents a Prákrit form *rāaṇāṇa*; but the shortening of the second *a* may be a local peculiarity. As a rule the Páli does not observe the later Prákrit rule of eliding medial consonants (here *j*), as may be seen from the Páli legend on the coins of Kadphises. But the adoption of it by the Western or Arian Páli in the case of the title *Rájá* is also proved by the Sháhbázgarhi rock inscription of Asoka, which has *rayo* instead of the *rájá* and *lájá* of Girnar and Dhauli. The approximation of the Western Páli to the later Prákrit is also shown by the use, in the former, of the Prákrit form *baraya* "twelve" (see Cunningham, C. I. I., pp. 42, 67 and Vr. 2, 14 *baráha*), instead of the ordinary Páli *duvadasa*. The word *rāonáno* has not hitherto been fully understood. Prinsep took it as two words *ráo-náno*, and explained *náno* as the Sanskrit *náná* "repeatedly." Wilson and after him Lassen also divided the word, but into *raoná-no*, interpreting *raoná* as the plural of *ráo*, and *no* as the genitive affix of the Gujaráti. But it may be doubted whether the documentary use of that affix is so old. Kanerki is the name of the king, and is supposed to be identical with *Kanishka* of Kashmerian history. The word *korano* has not yet been satisfactorily explained. Perhaps the identification of it with the Greek *koiranos* "chief," especially a "military chief" (as Masson and Wilson, see *Ariana Antiqua*, 78, 358, and Ed. Thomas' *Jainism*, p. 20), is after all the most plausible. The use of an old Greek word need not surprise, for there are also other signs of a Greek revival in the time of king Kanerki in the use of Greek deity-names (see also Ed. Thomas' *Jainism*, p. 8). Lassen takes it to be a Greek corruption of *kushana*, expressing some title (see *Ind. Ant.*, Vol. II, p. 389). The whole legend then would mean: "the king of kings, Kanerki, the war-chief."

(b.) *Reverse*—The figure is that of Buddha as shown by his posture and attributes and the inscription. The posture of preaching or blessing, the tuft of hair on the top, the large ears and the lotus characterise the figure too clearly to be mistaken (Wilson's A. A., 363), and this is confirmed by the inscription which is in Greek characters ΒοΔΔο, *i. e.*, Βοδδo or *buddha*.

2. No. XII. One specimen only. *Obverse*—Figure and inscription like that on No. XI.

*Reverse*—Standing male figure; general posture resembling that on the reverse of No. I, but left arm a-kimbo with hand on the hilt of a short sword, protruding on the left side; right arm extended straight, with apparently all the fingers of the hand closed except two; dressed in a long thin robe and pallium; a rayed nimbus, with fillets, round the head. Same monogram as on No. XI, but on the left of the coin (No. 7 on Pl. I, table III); on its right the inscription; a circle of dots all round, but a little off the rim.

Explanation. *Obverse*—As in No. XI.

*Reverse*—The figure is supposed to represent the Persian Sun-god, *Mithra*. This is indicated by the filleted nimbus of rays and the inscription which is in Greek characters ΜΙΙΡο, i. e., *μυρο*. This appears to be a local form of *mihiro*, in modern Persian *mihir*, a corruption of *mithra*. In western Páli and Prákrit *mithra* would regularly turn into *midhiro* or *mihiro*. On some other coins of this kind the word is found spelled *miaro* (= *miharo*) or *mithra*.

3. No. XIII. One specimen only. *Obverse*—Figure and inscription as on No. XI, only the sword is wanting, but probably only worn off, and the head-dress appears to be a high Tartar cap rather than a helmet or crown.

*Reverse*—Standing male figure; general posture and dress exactly as on No. XII. Here the left hand seems to rest on two swords instead of one; perhaps they are large pincers, if the figure be rightly interpreted as Vulcan. In the extended right hand a scroll; something like flames issuing from behind both shoulders; on the head which is full-bearded, apparently a low cap with fillet. Monogram as on No. XII. On the right side the inscription. A circle of dots originally round the circumference, but about one-third worn away.

Explanation. *Obverse*—As in No. XI.

*Reverse*.—The legend is in Greek characters ΑΘΡο, i. e., *αθρο* which has been conjectured by Prinsep to be the Zend word *atars* or *athro* “fire,” and to represent the god of fire (Wilson’s A. A. 362) or Vulkan (Ed. Thomas’ *Jainism*, p. 76), indicated by the pincers, if that be the indistinct object.

4. No. XIV. One specimen only. *Obverse*—As on No. XIII, except that here the hook also is wanting, and the dots between the feet of the figure; but both apparently worn off.

*Reverse*.—Standing male figure; general posture as in No. XII; left arm a-kimbo, with hand resting on the hilt of a short sword and holding a long staff surmounted by a ball, below which four streamers are attached to it. The staff is held across the body, so as to touch the left shoulder and form an X with the body; the right arm extended, having all the fingers of the hand closed except two (apparently the second and the middle fingers). On the head there appears to be a cap or diadem (much effaced) with fillets, from under which thick hair protrudes. What has been above described as streamers are possibly the continuation of these fillets. The head is enclosed between the crescent of the moon projecting from the shoulders. Monogram as in No. XII. On the right side the inscription. Circle of dots originally round the circumference, but about one half worn away.

Explanation. *Obverse*—Figure and legend as on No. XI, except that the legend is in the Greek language; on the right of the coin ΒΑΣΙΛΕΥΣ ΒΑΚΙ, on the left ΑΕΩΝ ΚΑΝΗΡΚΟΥ, *i. e.*, βασιλεὺς βασιλεων κανηρκου, meaning “the king of kings Kanerkou.” The title *korano* is omitted, apparently only for want of space, the Greek legend occupying more room than the Páli one. The termination *ou* of the name seems to be only a græcified form of the Páli *i*.

*Reverse*—The figure is clearly that of the moon-god. This is shown by the attribute of the crescent on the shoulders, as well as by the legend in Greek language and Greek characters ΣΑΛΗΝΗ, *i. e.*, σαληνη “moon,” though it is wrongly spelled with α for ε. As the figure is male, it is meant for the *Deus Lunus* as seen on the coins of Asia Minor (see Wilson A. A., 360). The figure very closely resembles that of the Sun-god (or Apollo), as seen on No. XII; the principal difference being the crescent here for the rayed nimbus there.

This coin also is unique and is the most important of the collection, being, so far as I am aware, the only specimen, known hitherto, which has the legend *selene*. All those, known hitherto, of a like kind, *i. e.*, bearing similar figures on the obverses and reverses, have Páli legends, *viz.*, on the obverse *raonano rao etc.*, on the reverse *mao* (see Wilson A. A., Pl. XII, 1, 13). The latter has been rightly identified with the Zend *mao* and Sanskrit *mása* “moon” (see Wilson A. A. 360). The present specimen is their exact Greek counterpart. Those coins of Kanerki which bear on the reverse the legend *nanaia* should not be confounded with these. Nanaia is the Persian Artemis and her figure is very different. It is that of a woman, with quite different attributes and without the crescent (see Wilson’s A. A., Pl. XI, 17). The Páli counterparts of the *nanaia* coins bear the legend *nana* or *nano* (see Wilson, Pl. XII, 2, 12).

### 5. *Two Specimens.*

*a.* No. XV. *Obverse*—Figure and inscription exactly as on No. XI.

*Reverse*—Figure, slightly effaced, the same as on No. XVII, where it will be described. Monogram as on No. XII; on the right of the coin the inscription; circle of dots along the rim, slightly worn.

Explanation. *Obverse*—Figure and inscription as on No. XI.

*Reverse*—The legend is in Greek characters οΗΡΟ. It has generally been taken to be *okpo* (*okro*, see Wilson’s A. A., 361), but, I am persuaded, wrongly. It is *onpo* (*oiro*). The second letter is a corrupt form of η (No. 22 on Pl. I, table II). The same corrupt form also occurs on the obverse in the name *Kanirkou* where it undoubtedly stands for η. The letter κ occurs



three times on the obverse and is always distinctly K (see Pl. I, table II). In fact in all coins of Kanerki, having a Páli legend,  $\eta$  is uniformly distinguished in this way from  $\kappa$ , as may be seen by comparing Nos. 19, 22, 24 with No. 33 on table II. The corrupt form for  $\eta$  already occurs in No. X, of Kadphises. It is only on the Kanerki coins with a Greek legend (as in No. XIV), that  $\eta$  appears in its proper form H; but in these, too, K is always K, while the corrupt form of  $\eta$  does not occur at all (see Nos. 20 and 34 on table II). It may be observed that Nos. 18, 19, 21 are evidently the intermediate form between Nos. 17, 20 and Nos. 22, 23, 24. The legend  $\sigma\eta\mu\omega$  I would identify either with *víra* or with *híra*;  $\sigma$  standing both for *v* and for *h* (see p. 126). *Víra* (for the fuller form *vírabhadra*) as well as *híra* are, according to Jaṭádhara, names of Śiva. The figure is that of Śiva, as shown by his attributes of the *triśúla*, drum, noose and deer. Usually he has only two hands, but in the *dhyána* or religious meditation of the daily worship and frequently in the shastras he is represented with four. The attributes in such four-handed representations of Śiva vary very much. Usually the two lower hands are in the attitudes of blessing and giving; in the upper hands are a trident and thunderbolt, or trident and noose, or thunderbolt and drum, or axe and deer, or trident and skull, (see Moor's *Hindu Pantheon*, and Radha Kanta Deva's *Sabdakalpadruma*). Sometimes there is an object in each of the four hands, as noose, red lotus, skull and trident. The combination of objects represented on the present coin I do not remember to have met with elsewhere.

b. No. XVI. A duplicate of No. XV.

In the coins of Kanerki a further step is observable in the corruption of the form of the Greek letters, see Pl. I, table II. The corruptions occurring in No. X of Kadphises continue. Additional are the two corrupt forms 44, 45 for N. The only exception is the coin No. XIV which has a legend not only in Greek characters but also in the Greek language. Here the letters are of superior make, see table II; especially N and H and A are well made.

### C. *Coins of Hverki.*

Of these there is only one specimen.

No. XVII. *Obverse*—Bust of king; general posture like that of No. VI; to the front, head to the right; on left cheek thick, pendent whiskers (as in Wilson's A. A., Pl. XIV, 1; perhaps intended for cheek plates, as in Pl. XIV, 3. and Ed. Thomas' *Jainism*, Pl. II. 14); chin and lips shaven; dressed in coat of mail; on the head a crown or ornamental helmet (as in Wilson's A. A., Pl. XIV. 2), consisting of a circular band, studded with jewels and surmounted by a dome, which has on its side a crescent or circle,

partly effaced, and on its summit something like a trident or flower; double frontlets and fillets; in the right hand an iron-bound mace carried erect; in the left a sceptre (apparently a stalk with flowers and leaves, as in Wilson's A. A., Pl. XIV, 1). Inscription on the right and left of the coin; below the bust some ornamentation, taking the place of the legend of No. VI; the monogram, on the left (No. 8 on Pl. I, table III), differs from those of Kadphises and Kanerki.

*Reverse*—Standing male figure; general posture as in No. XI, to the front, head to the right; upper part of body naked, with a chaplet of balls round the left shoulder; the lower part dressed in ordinary Brahminical *dhotie*; hair thickly matted, and done into a knot on the summit; nimbus round the head; four arms each with two armlets, one at the wrist, the other above the elbow; in the upper right hand an Indian drum, in the lower a hook or *ankusa* and a sort of sceptre (held cross-wise); in the upper left hand a long *triśúla*, held cross-wise (like the staff in No. XIV); in the lower, placed nearly a-kimbo, a short noose, by which he is leading after him an animal. The latter in Nos. XV and XVI looks very much like a deer or goat. On the present coin long bristling hair is distinctly visible on its body. It is very small, standing below the angle of the lower left arm, and (in Nos. XV, XVI, though not in No. XVII) looks as if rising towards the figure on its hind legs. Monogram and inscription as in No. XV. Circle of dots along the rim.

Both as regards execution and preservation this is a very good specimen. The Greek characters generally resemble those on the coins of Kanerki, see Pl. I, table II. But N appears in the still ruder shape 46 and hardly distinguishable from 21 for H. Nos. 44, 45 evidently are the forms intermediate between 42 and 46.

*Explanation.* *Obverse*—The inscription is the same as on Nos. XI to XVI, only substituting *oonpki* for *kavnpki*; thus on the right PAoNANo PAo o; on the left oHPKI KoPANo; *i. e.*, *paovavo pao oonpki kopavo* "the king of kings, Hvirki, the warrior-chief." The Greek *oonpki* represents the name of king *huvishka* (see Ed. Thomas' *Jainism*, pp. 11, 12) and must, therefore, be read *hvirki* (see p. 126) or *hverki*.

*Reverse*—Figure and inscription as in No. XV.

## II. ROMAN COINS.

These are of three different reigns; of Domitian, Trajan, and Hadrian; one specimen of each.

### 1. *Domitian.*

No. XVIII. *Obverse*—Bust of emperor, with legend AVGVSTVS DOMITIANVS. Circle of dots round the rim.



*Reverse*—Figure of Minerva, to the front; head to the right; in long robe; with plumed helmet; spear in left arm, and shield on the ground, leaning against her; right arm raised and holding a thunderbolt. Legend GERMANICVS COS XV. Circle of dots.

No specimens with this figure on the reverse are mentioned by Akerman, *Roman Coins*, pp. 200, 201. Those he gives have either the emperor in a quadriga or a recumbent Germany.

## 2. *Trajan.*

No. XIX. *Obverse*—Bust of emperor. Legend IMP CAES NER, TRAIANO OPTIMO AVG GER DAC, *i. e.*, (the Emperor Cæsar Nerva Trajanus the Best, the August, the Conqueror of Germania and Dacia). Circle of dots.

*Reverse*—The emperor seated on an estrade upon a cross-legged stool, with two soldiers standing beside him on the estrade, one on each side; in front of him on the ground three men, full-bearded, apparently naked, excepting a skin (?) thrown over the shoulders; the foremost of them lifting his arms in an attitude of prayer. Legend REGNA ADSIGNATA. No circle of dots, apparently worn off.

This is a rather common coin; specimens in gold, silver and copper are mentioned by Akerman, *R. C.*, pp. 217, 221.

## 3. *Hadrian.*

No. XX. *Obverse*—Bust of the empress Julia Sabina, wife of the emperor Hadrian, married to him about A. D. 100, died by poison about A. D. 137. Profile to the right of the coin, with diadem, and one short plait reaching to the shoulders. Legend SABINA AVGVSTA. Circle of dots almost invisible; the rim considerably indented and worn.

*Reverse*—Figure of Juno to the front; head to the right; in long robe and pallium; with outstretched right hand presenting a wreath or crown; the left resting on a long staff; peacock standing on the ground on her left, in profile, his head turned up to her. Legend IVNONI REGINAE. Circle of dots, &c., as on obverse.

Mentioned by Akerman, *R. C.* p. 250.

## *Historical Notes.*

1. *Age of the Tope.*—The latest of the Roman coins is that of Hadrian's wife, Sabina. She died about A. D. 137. This limits the time backwards. Some time must be allowed for the wear and tear of it, and also for its travelling to Afghanistan. The construction of the Tope therefore cannot be placed earlier than the 3rd century A. D., nor, as the Indo-scythian coins show, can it probably have been much later. The Roman coins were put in

as curiosities, but the Indo-scythian coins must have been deposited as those current in the country. The notice by the author of the *Periplus* that in his time, the end of 1st century A. D., the drachms of Menander and Apollodotus, two Indo-grecian kings who reigned from about 150—100 B. C., were still current at Baroach on the coast of Gujarat (see Wilson's A. A. 281), gives an approximate limit of about 200 years, during which the coins of a king may be supposed to have remained current. Of the three Indo-scythian kings, whose coins have been found in the Tope, the two later ones are Kanerki and Hverki. They are generally placed in the first half of the first century A. D. Adding to this 200 years for the currency of their coins, the forward limit of time for the construction of the Tope would be the first half of the third century A. D. It is a noteworthy fact, that no Bactro-Grecian coin has ever been found in any Tope (see Wilson's A. A., 43); nor any Indo-Grecian, except of the last king of that line, Hermaeus, whose rule was subverted by the Scythian prince Kadphises in the first century B. C.; while foreign coins are often met with in them in conjunction with native ones. The omission cannot be well explained otherwise but by supposing (as Wilson A. A., 44), that they had ceased to be current at the time when the Topes were erected. It follows, then, that the coins which are found in the Topes must have been placed in them, as being contemporary and current, whether native and common (as the Indo-scythian) or foreign and rare (as the Roman).

2. *On Kadphises.*—The kings Kanerki and Hverki are admitted by all to be later than Kadphises, and placed in the first half of the first century A. D. As to Kadphises, it is commonly thought that there were two rulers of that name, one in the beginning, the other towards the end of the first century B. C.; and the present coins of Kadphises are ascribed to the second of that name. Some even distinguish a third one, called Kadaphes, a contemporary of the first Kadphises (so Lassen). The subject is involved in much obscurity, owing to the data, which we have, being in part not easy to understand, in part difficult to reconcile. So far as I can judge them, there does not appear to be sufficient ground to distinguish three or even two men. The coins of the (so-called) first Kadphises and of Kadaphes are all of copper and badly preserved. The reading of their legend is by no means assured. Even if it were so, the two names are not sufficiently unlike to preclude the identity of the persons to whom they belonged. As regards the two Kadphises, the evidence, such as it is, rather seems to me to point to their unity. For (1) there is a striking resemblance in the figures on the reverse of their coins, as pointed out on p. 123. The coins of the last Indo-Greek king Hermaeus have on the reverse a sitting Jupiter; in those of Kadphises I, his place is

taken by a standing Hercules, and the same device re-occurs on those of Kadphises II, only exchanging the attributes of Hercules for those of Siva. The same name Kadphises occurs on the reverse of both; only the attributives vary, Kadphises II being called Great king, while Kadphises I is called merely a warrior-chief. Again on the obverse of Kadphises II, there is his own bust and superscription; while on that of Kadphises I, there is the bust of king Hermaeus with the latter's superscription, precisely the same, both as to figure and legend, as on the coins of Hermaeus himself. The coins of the so-called Kadphises I, clearly exhibit an intermediate or transition state, but do not necessarily point to a succession of three different rulers. It would rather appear, that under the weak king Hermaeus, the chief of one of the warlike Scythian tribes usurped the regal power, though not at first the regal title. Accordingly the obverse of the coins of the time was allowed to continue to bear the bust and legend of the nominal king, while on the reverse the usurper put his own name and device, the latter being a Greek one in imitation of the Greek device which it had supplanted. Later when Hermaeus was removed (perhaps by death), Kadphises assumed the regal titles also, and henceforth substituted his own bust and legend for those of Hermaeus. At the same time to further suit the changed state of things, the subordinate titles on the reverse were changed to the regal ones, and the Greek attributes of the figure on the reverse were also changed to native Indian ones, perhaps to conciliate his new subjects or to suit his own religious opinions. (2). The device of a standing Hercules used by Kadphises on the reverse of his coins, occurs on none of the coins of the Indo-Grecian kings; it is found only on the coins of three Bactro-Greek kings Euthydemus, Demetrius, and Lysias. The Bactrian Greek kingdom was founded by the two Theodotus, father and son, who had adopted as their device a standing Jupiter. The sovereignty was afterwards usurped by Euthydemus (about B. C., 215—185) who most probably had originally been ruler of Sogdiana (see Lassen I. A., Vol. II, pp. 284, 293) and who substituted his own device of Hercules (either standing or sitting). His son Demetrius (about 185—160 B. C.), who ruled not only Sogdiana and Bactriana, but extended his empire to the south and south-east as far as India proper, continued the same device of a standing Hercules. Towards the close of Demetrius' reign, however, his overgrown empire broke up. Thus Eukratides and Antimachus (about B. C. 165—145) wrested the southern parts of the empire from him, as shown by the fact, that the coins of these two kings are the first which have Arian-Páli legends. In Bactriana and Sogdiana itself Demetrius was succeeded by Lysias (about B. C. 160—140) who continues the old device of the standing Hercules and who re-conquered (about B. C. 145) some parts of his patrimony in the south from Helio-

cles, the son of Eukratides, as shown by his coins bearing an Arian-Páli legend. The device of Hercules, especially the standing one, may, therefore, be looked upon as peculiar to the Sogdian line of Bactro-Greek princes. Not long afterwards—there appears to have been an intermediate Queen Agathokleia, whose coin also shows the sitting Hercules—the Bactro-Greek kingdoms were subverted by Scythian tribes. The first to suffer that fate naturally was the northern kingdom of Sogdia and Bactria about B. D. 127. The southern kingdoms continued for a short time longer. The Sogdians themselves were Scythians, and they were joined by other tribes of the same race, living further to the east. Their leader would naturally assume the device of the standing Hercules of the old Sogdian house of Greek princes. This was done by Kadphises, under whom the Sogdian Scyths, advancing southwards, encroached on, and finally subverted the southern Greek kingdom under the last Greek king Hermaeus, about B. D. 90. (3). In the legend of his coins, as read by me, Kadphises describes himself as the sovereign of the Sogda people. This would agree with and confirm the facts as stated in No. 2. It may be noticed also that Arrian (in his *Anabasis* VI, 15, 4) mentions a people of Sogds as living on the Indus, though already at the time of Alexander's invasion.

Mr. H. F. BLANFORD exhibited an enlarged photograph of a portion of the solar disk, taken by M. Janssen at the Meudon observatory. Referring to the observation of Mr. Nasmyth more than twenty years ago, that the surface of the sun appeared to be composed of lenticular luminous masses which had been compared by some to willow-leaves and by others to rice-grains, he pointed out that the study of the solar surface by ocular inspection was attended with very great difficulties, owing to the intensity of the glare, which renders it almost impossible to determine the true forms of the luminous elements, notwithstanding such protection as may be afforded by the use of dark and coloured glasses. On the other hand in such photographs as have been taken for some years past at Kew and Greenwich, no structure is perceptible ; and that this is the case arises from the phenomenon known as photographic irradiation. Any very brilliant object when represented in a photograph appears with blurred boundaries, the brilliantly illuminated surface extending beyond its true outlines over any darker objects around. Hence, the solar surface, which as M. Janssen's photographs show, consists of brilliant granules surrounded by others which are comparatively shaded, presents a blank area of uniform white. M. Janssen is the first who has succeeded in conquering this difficulty ; and, for the last two years, has obtained photographs, on all clear days, which present the details of structure so sharply and distinctly, that they may be enlarged



not less than nine diameters (81 times in superficial extent) for the purpose of convenient study. The specimen exhibited is one of these enlarged photographs.

The original pictures having represented the sun's disk with a diameter of 30·5 centimetres, the enlarged photograph represented the central portion of a disk which, if complete, would be not less than 2·745 metres or about 9 feet in diameter.\* It showed in great perfection, the granular structure of the surface and that differentiation of parts which M. Janssen terms the '*réseau photosphérique*.' In certain areas, all the granules are more or less confused and drawn out as if swept along in a gaseous current; while, in the intervening tracts, they are distinct and rounded in form, presenting a series of brilliant dots surrounded by more shaded portions. M. Janssen is now engaged on the study of the movements thus brought to light, and this may be done with comparative ease with photographs, which afford an exact representation of the solar surface taken at intervals of 3 or 4 minutes or less.

The method which M. Janssen has devised with such signal success, depends on the fact that the prepared plate is not equally sensitive to all parts of the spectrum. In a series of experimental photographs of the solar spectrum which M. Janssen had taken in the speaker's presence, an exposure of one-third of a second gave only that portion immediately about the G line; as the exposure was prolonged, the image was extended further in both directions; and from two to three minutes gave the whole that could be obtained without the admixture of special pigments in the collodion. The first condition, then, requisite to obtain a sharp image of the granulations is to limit the exposure to the time requisite for the action of the G ray (and those rays immediately contiguous). This, in the case of the whole solar disk and in a favourable state of the atmosphere, is from  $\frac{1}{3000}$  to  $\frac{1}{3000}$  of a second. The second condition (seeing that no lens is completely achromatic, that is to say, that no lens has absolutely the same focus for all rays) is to adjust the sensitive surface of the plate to the focus of the G ray. And the third is to employ a collodion which presents a very perfect and even surface. The duration of the exposure is measured and adjusted by a very ingenious application of the tuning-fork. A sliding screen with a narrow slit is drawn by springs rapidly across the image formed in the focus of the objective. The width of the slit can be varied and adjusted by means of a micrometer screw. To determine the duration of exposure, a small slip of glass, previously smoked in a candle flame, is attached by a little wax to the slide, and a tuning-fork giving a known note (*i. e.*, giving a known number of vibrations per second,) with a bristle attached to one

\* On this scale the earth's disk would be about 1 inch in diameter.

of its prongs, is set vibrating transversely to the path of the slide. The slide being then released, a waved line is engraved on the smoked surface; and supposing that the fork vibrates 500 times in the second, the length of each wave represents the distance traversed in  $\frac{1}{500}$  of a second. If then the width of the slit be adjusted to one-sixth of a wave length, the duration of the exposure afforded will be  $\frac{1}{3000}$  of a second.

In conclusion, Mr. Blanford remarked on the wide field for the study of solar phenomena which is opened up by M. Janssen's discovery. The sun is still passing through a prolonged period of minimum activity, indicated by the absence of spots, faculæ and hydrogen flames. It is now in a state of comparative quiescence. Mr. Norman Lockyer has particularly remarked the reduced size of the corona, the absence of hydrogen flames and the predominance of the characteristic lines of magnesium\* in the chromosphere of the late eclipse. It will be especially interesting to observe the changes presented when the sun approaches another period of maximum activity, since faculæ always accompany sun-spots. It may be safely predicted that the brilliant faculæ and hydrogen flames (the same phenomenon seen from two different points of view) will increase at least to the same extent as the spots, and thus will probably be explained the apparent paradox which results from measurements (such as we have) of the solar radiation, *viz.*, that the sun is hottest when the spots are most numerous. It is a common popular idea, that the reverse is the case. Ignoring direct observation and reasoning *à priori*, it is inferred that the spots being cooler than the luminous disk, the sun must emit less heat when these are most numerous. It is with the character of the sun's surface as with that of men. The eye seizes quickly on the blots, but ignores and takes no note of the brilliant faculæ which accompany them, and out-shine the general surface.

CAPT. WATERHOUSE observed, with reference to Mr. Blanford's statement that the photographs of the sun previous to those done by M. Janssen were quite blank and showed no traces of structure beyond the spots, that when exhibiting one of M. Janssen's photographs at the Meeting in May last, he had mentioned that some of the small photographs taken with the photoheliograph by Colonel Tennant at Roorkee after the Transit of Venus showed very distinct traces of structure over the solar disc, and though of course they were wanting in the fine details of the granular structure, the outlines of what he believed M. Janssen called the polygons of his network were easily distinguishable. These photographs had been very carefully

\* Mr. Lockyer's view as is well known is that the greater intensity of the solar heat at the time of maximum sun-spots, causes a dissociation of the magnesium molecules, resolving it into hydrogen.



taken by Colonel Tennant and developed with pyrogallic acid. Some of the photographs taken in Calcutta with the same instrument on dry plates by Sapper Meins, who was sent out by the Secretary of State to take photographs of sun-spots, also showed the same structure. Owing to want of the proper appliances none of these photographs had been enlarged, and they were too small to give anything like such satisfactory results as those obtained by M. Janssen because the size of the disc was only 4 inches instead of 12 inches.

The following papers were read:—

1. *On a new Standard of Light.*—By L. SCHWENDLER, Esq.  
(Abstract.)

The author illustrated his paper by exhibiting an actual standard. The new standard of light consists of a piece of pure sheet platinum of an U shape, cut accurately to fixed dimensions. When a sufficiently strong electric current is made to pass through the platinum, it becomes white-hot and emits a brilliant light. He showed experimentally how the intensity of this light could be varied, *i. e.*, the magnitude of the standard altered,—by varying the current, and that when the current was kept constant, the light was rigorously constant also.

Mr. Schwendler defines the new unit of light as :

*The quantity of light emitted from a piece of pure platinum weighing (x) grm. and having the most convenient shape and size, when a constant current of (y) webers per second passes through it.*

The advantages of the new standard are :

The Light is perfectly constant if the current is kept constant ; it allows a correction to be made for the variation of the current when this variation is known ; it can be reproduced very accurately anywhere ; its magnitude can be altered to any extent to suit certain practical purposes by simply varying the elements of weight, shape and size of the platinum, or the strength of the current passing through it ; it does not alter of itself, either in intensity, size, or position, and therefore most accurate photometric measurements can be made with it ; the standard can be easily made to fit into any adopted system of absolute units. Hence the new standard fulfils *all* the recognised conditions of a perfect and rational standard, and Mr. Schwendler therefore proposes it should be adopted in future in England and India in lieu of the *Standard Candle*.

Mr. Schwendler concluded by saying that there would be no practical difficulties met with in the introduction of the new standard for technical purposes. Gas Companies and other Corporations that may in time be formed to supply that necessary commodity "light," to the general public would find it quite easy and highly satisfactory to themselves to

use such a reliable standard for measuring the light they sell, and the public on the other hand, would then know correctly the quantity of light they receive, and for what they have to pay.

The paper, written at the beginning of 1878, and originally intended to form an appendix to Mr. Schwendler's report "on the Electric Light experiments," will be printed in the Journal, Part II.

2. *Notes on the Old Burmese route over Patkoi viâ Nongyang.*—By  
S. E. PEAL, ESQ.

(Abstract.)

In this paper the author shows the advantages to be gained by opening out a trade route between India, Burma and China over the Patkoi range, and recounts the various explorations that have been made with this object.

The paper will be published, with maps, in the Journal, Part II.

3. *On some experiments made at H. M.'s Mint in Calcutta on coining Silver into Rupees.*—By COL. J. F. TENNANT, B. E., C. I. E., F. R. S., &c., *Master of the Mint.*

(Abstract.)

This paper contains an account of some experiments made by the author to ascertain the cause and extent of the apparent refining that takes place when an alligation containing fine silver and copper is melted and of the further changes in the alloy during the processes of coining. The author also places on record some interesting information as to the general working of the Mint.

The paper will be published in the Journal, Part II.

4. *Observations on some Chandel Antiquities.*—By F. C. BLACK,  
C. E., and V. A. SMITH, B. A., C. S.

(Abstract.)

This paper is intended to be supplementary to the accounts of Mahoba and Khajuráho given in General Cunningham's Archæological Reports.

The present position of the Chandel clan is briefly noticed, and the rumoured existence of an unpublished inscription at Khajuráho is mentioned. The writers suggest that the 'magic square' cut on the right jamb of the door of the Jinanáth temple may not be ancient, and urge the necessity for careful editing of the known Chandel inscriptions. The discovery of two short inscriptions near Mahoba, and of a sixth life-size elephant statue in the Madan Ságar is announced.

Some remarks on the construction and decoration of the Khajuráho temples are offered, and stress is laid on the proofs of the extent to which restorations have been effected.



The questions as to the age and destination of the Ganṭhái temple are discussed at length, with the result that in the writer's belief this temple is not nearly so ancient as has been supposed by General Cunningham and Mr. Fergusson, but is on the contrary a comparatively modern unfinished restoration, composed possibly of ancient materials. This temple probably belonged to the Jains, and not to the Buddhists.

The concluding section of the paper is devoted to a description of three hitherto undescribed temples. These buildings are rectangular in plan and seem to have been Jain.

The writers hope in another paper to describe certain other remarkable buildings.

The paper will be published in the Journal, Part I.

5. *A Chandel Inscription dated 1240 S.*—By V. A. SMITH, B. A., C. S.  
(Abstract.)

The inscription from Mahoba of which I send a rubbing and hand-copy appears to me worth publishing, for although it is unfortunately very imperfect, it contains several names not mentioned in the Chandel inscriptions which have been published.

The record is engraved in very distinct Kutila characters on a large\* black slab, which was discovered by General Cunningham in 1843, built into the northern wall of the building known popularly as Rájá Parmal's fort.

In his account of Mahoba (Arch. Report, Vol. II), General Cunningham speaks of this inscription as one of Parmal's or Paramárdi's, but in a private letter to me he explains that he "did not mean to attribute it to Paramárdi himself, but only to the period of his reign."

The inscription does not contain the name of the reigning Rájá, but there can be little doubt that the year 1240 S. was included in the reign of Parmál.

I cannot venture on a translation of what is left of this curious record, but perhaps some more learned member of the Society may be induced to take the trouble of making a translation so far as is possible.

No personal name appears in the first ten lines, which are occupied with the praises of some one whose name is lost.

The whole inscription consists of sixteen lines, at the eleventh of which the first complete verse is found. The record then goes on to state that "in the great family of Vátsavya was born Suhila son of Hallaṇ." Reference is made to somebody named Jayapála, and the names of Nánika the founder of the Chandel dynasty, of Lakshmaṇa, Kalála, and Mádhava occur. Devája the son of Somarája is mentioned near the end as a skilled workman, and the inscription appears to be intended to commemorate the erection of an edifice, probably a temple, with a "lofty steeple" (*s'ikhara*).

\* The inscription as it now stands measures 27" × 14".

Nothing is known as to the original locality of this inscribed slab. Mr. F. C. Black has preserved it from further injury by fixing it carefully in the wall of the main magazine near Manoba.

This paper will be published in the Journal, Part I.

6. *Nemo in India etc., found at Sankesur. Patparghat District.—By H. Rivett-Carnac Esq. C. S. I. C. I. E. R. S. A. M. R. A. S. &c.*

(Abstract.)

This paper describes discs and seals of baked clay, which were found by Mr. Rivett-Carnac in large quantities in the ruins near Sankesur and Benar (see General Cunningham, Arch. Survey, Vol. I, p. 371), and of which he forwarded a few specimens. The discs are small, from 1 to 2 inches wide, and about  $\frac{1}{2}$  inch thick. They are mostly quite plain, a few are more or less ornamented: one of them bore a well defined Maltese cross: some of them are pierced in the centre. There were also some discs of marble, crystal or other polished stone, and of various sizes (the smallest about  $\frac{1}{2}$  inch wide): only one of these (apparently of granite) showed the central hole. Mr. Carnac suggests that these discs were votive offerings at the Buddhist shrines of Sankesur: those of clay being the gifts of the poorer classes, the others those of the rich, and the perforated ones perhaps signifying that the prayer had been granted. The clay seals, also, are small, from 1 to  $1\frac{1}{2}$  inches wide. Most of them bear an inscription, generally in the Kutila characters, but one in Gupta; containing the Buddhist creed: *ye dharmā hetuprabhavā hetum tesāṃ tathāgato hya-datteshāṃ cha yonirokṣhā eṣaṃ sādī mahāpramāṇaḥ*. In a note, contributed by Dr. Mitra, he says that these seals are well known. They were first noticed by Mr. Thomas in his paper on the ruins of Sarnāth; then by General Cunningham in his "Bhilsa Topes." They have been also noticed by Dr. Mitra himself in his "Buddha Gaya," p. 119, ff. Two, however, of Mr. Rivett-Carnac's seals are new. One of them has the word *वसुधैव कुटुम्बकम्* "of every day" on it. The other has four letters, which, two being very doubtful, cannot be read; there are two deer on it which show that it is Buddhist.

### LIBRARY.

The following additions have been made to the Library since the Meeting held in March last.

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*Williams, W. M.*—A Contribution to the History of Electric Lighting. *Ayrton, W. E.*—Electric Lighting by Incandescence. *Thomas, E.* and *Houston, E. J.*—On the Transmission of Power by means of Electricity.

———. Society of Arts,—Journal, Vol. XXVII, Nos. 1363, 1364 and Nos. 1368 to 1372.

No. 1364. *Blakely, E. T.*—The Silk Industry of Northern Italy.

No. 1368. *Wallace, W.*—Gas Illumination. *Birdwood, G.*—The Quest and Early European Settlement of India.

No. 1370. *Hollway, J.*—On a New Application of Rapid Oxidation, by which Sulphides are utilised for Fuel.

———. The Westminster Review,—New Series, Vol. LV, No. 1, January 1879.

Afghanistan—India and our Colonial Empire.

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*Govi, G.*—De la mesure du grossissement dans les instruments d'optique.

———. Comptes Rendus,—Tome LXXXVIII, Nos. 4 to 8.

No. 4. *Marcano, V.* and *Muntz, A.*—Sur la composition de la banane, et sur des essais d'utilisation de ce fruit. *Thollon, M. L.*—Déplacement de raies spectrales, dû au mouvement de rotation du Soleil.

No. 5. *Malarce, M. de.*—Extension du système métrique des poids et mesures; développement de systèmes monétaires conformes ou concordant dans les divers états du monde.

No. 6. *Chatin, M. A.*—Sur l'existence d'un appareil préhenseur ou complémentaire d'adhérence dans les plantes parasites.

No. 7. *Marey, E. J.*—Nouvelles recherches sur les poissons électriques; caractères de la décharge du Gymnote; effets d'une décharge de Torpille, lancée dans un téléphone.

No. 8. *Cros, Ch.*—De l'action des différentes lumières colorées sur une couche de bromure d'argent imprégnée de diverses matières colorantes organiques.

———. Revue Critique d'histoire et de littérature, Nos. 5 to 8.

———. Revue des Deux Mondes, Tome XXXI, Livraisons 3 and 4, and Tome XXXII, Livraison 1.

———. Revue Scientifique, Tome XVI, Nos. 31 to 35.

No. 33. *Bertillon, J.*—Les célibataires, les veufs et les divorcés, au point de vue du mariage.

No. 34. *Joly, N.*—Origine des animaux domestiques.

No. 35. *Salet, G.*—La décomposition des corps simples, d'après les récents travaux de M. N. Lockyer. *Thoulet, J.*—Le nickel, ses gisements, sa métallurgie et ses usages. *Fontpertuis, Ad. F. de.*—L'émigration Chinoise.

———. Journal des Savants,—January 1879.

*Saint-Hilaire, B.*—Sept Suttas pâlis, tirés du Dighā-Nikāya.

### BOOK PURCHASED.

FONSECA, J. N. Historical and Archæological Sketch of Goa, with map, plan and lithographic plates. 8vo., Bombay, 1878.





PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR MAY, 1879,

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The Monthly General Meeting of the Asiatic Society of Bengal was held on Tuesday, the 7th May, at 9½ o'clock P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed :—

The following presentations were announced—

1. From the author. A History of the Brahma Samaj, by G. S. Leonard.
2. From the Royal Academy of Sciences, Munich. *Catalogus Codicum Latinorum Bibliothecæ Regiæ Monacensis*.
3. From the Director of Public Instruction. A Manual of Thibetan, by Major T. H. Lewin.
4. From the Superintendent Geological Survey of India. A Manual of the Geology of India, by H. B. Medlicott, and W. T. Blanford.
5. From the Smithsonian Institute. Scientific Results of the Exploration of Alaska, Article IV, Report on Limpets and Chitons, by W. H. Dall.
6. From the author. A catalogue of Mammals, Birds, Reptiles and Fishes of the Dominion of Canada, by A. M. Ross.
7. From the author. A Hindi Translation of the Raghuvansa, by Rájá Lachman Singh.
8. From the Government of Victoria. The Aborigines of Victoria, by R. Brough Smyth.
9. From the Curators of the Bodleian Library. *Catalogus Codicum Manuscriptorum Bibliothecæ Bodleianæ*, Pars. VI, *Codices Syriaci, Carshunici et Mendæi*, by R. Payne Smith, Pars. VII, *Codices Æthiopici*, by A. Dillman, and Pars. VIII, *Codices Sanscritici*, by Th. Aufrecht.

The following gentlemen, duly proposed and seconded at the last Meeting, were ballotted for and elected Ordinary Members—

J. M. Muir, Esq., C. S.      A. Smidt, Esq.

J. Schroder, Esq.      C. J. Sheridan, Esq., C. E.

Mr. A. H. Anthony and Babu Uday Chand Dutt have intimated their desire to withdraw from the Society.

The COUNCIL reported that the following gentlemen had been nominated by the Council for election as Honorary Members of the Society.

Professor E. B. Cowell.

Dr. J. Janssen.

Professor Regnand.

Dr. A. Günther.

Prof. H. Milne-Edwards.

Professor EDWARD BAYLES COWELL, D. C. L., Edinburgh, is recommended in recognition of his services to the Society and to the cause of Sanskrit literature. He was elected a member of the Society on March 4th, 1857, and held the office of Philological Secretary from 1858 to 1864 when he retired from the country. When he joined the Society he had already established his reputation as an oriental scholar by his dissertation on Persian Poetry, published in the "Oxford Essays," and by an edition of the Prākṛit Grammar of Vararuchi with an English translation. During his stay in India he contributed several valuable papers to the Journal of the Society. He likewise edited for the Society a volume of the Taittiriya Sañhitā of the Black Yajur Veda, and published the texts along with English translations of the Maitri Upanishad of the Black Yajur Veda. The Kaushitaki Brāhmaṇa Upanishad of the Rig Veda, and the Kusumāñjali, an abstruse treatise on the Hindu arguments for and against the existence of the Deity. Since his retirement his interest in the labours of the Society has remained unchanged, and he has contributed largely to the elucidation of many intricate questions connected with the history of Sanskrit literature. He has published a volume in continuation of the late Dr. H. H. Wilson's translation of the Rig Veda Sañhitā, an epitome of the several philosophical dogmas of ancient India, being a translation of the Sarvadarśana Sangraha, and the text along with an English translation of the Aphorisms of Sāṅdilya on the Hindu doctrine of faith. As a Sanskrit scholar he ranks with the foremost orientalists of Europe.

Professor RENAUD is recommended in appreciation of the great services he has rendered to the cause of Semitic learning by his numerous dissertations on the literature of the Arabs, and by his researches into the Geography of Asia as known to the Arabs, and in recognition of the distinguished position he holds as an eminent Arabic scholar.

ALBERT GUNTHER, M. D., PH. D., V. P. R. S., Keeper of the Department of Zoology in the British Museum, has chiefly devoted himself to the

study of Vertebrata. His Catalogues of Reptiles and especially of Fish are amongst the most important works published by the Trustees of the British Museum. He is especially entitled to recognition in India on account of his "Reptiles of British India," published by the Ray Society, a most valuable work, and the first complete monograph of any one class of Indian animals ever published.

HENRI MILNE-EDWARDS, Professor of Natural History in the Museum of Natural History, Paris, Foreign Member of the Royal Geological and Zoological Societies, has long been one of the first naturalists in Europe. He has written on many subdivisions of the animal kingdom, but his best known works refer to the Crustacea and the Corals; the modern arrangement of both of which has, in great measure, been founded upon his work.

M. JULES JANSSEN's original work as a physicist has been chiefly in connection with the Spectroscope. His earlier observations were directed to a determination of the selective absorption of the atmosphere for light and especially that of the vapour atmosphere. But his great discovery made in India, when engaged in observing the Solar eclipse of 1868, was the method of viewing the hydrogen flames of the Solar atmosphere at all times, by means of the spectroscope. This discovery was made independently and almost simultaneously, by Mr. J. Norman Lockyer. His latest discovery is perhaps even more important. By an ingenious limitation of the photogenic action of the sun, he has succeeded in photographing the solar surface with a degree of delicacy never before approached, and has thus opened out a new and most powerful method of studying the physical condition of the luminary.

The PRESIDENT said that the Council had also proposed to nominate Dr. Rájendralála Mitra as an Honorary Member, but Dr. Mitra had considered that by accepting the offer, he would not be in a position to do so much for the Society as at present, and had therefore begged to decline.

The COUNCIL reported that Mr. H. B. Medlicott had kindly undertaken the office of Treasurer during Mr. Beverley's absence on privilege leave.

The SECRETARY read a letter from Mr. H. RIVETT-CARNAC, C. I. E., in continuation of his first memorandum on the subject of the preservation of antiquarian remains, and in which he describes the destruction of carvings and sculptures from the ruins of Kanauj he had lately witnessed while marching between Cawnpore and Fatehgarh, where he found that the *kheras* or mounds with which the country is dotted were being excavated

by a party of contractor's men in search of ballast for the new railway between Cawnpore and Fatehgarh.

Mr. Carnae again urges the Society to address the Government of India and beg that local Governments may be requested to call the attention of officers engaged on railways and other works to the importance of preventing the destruction of ancient remains for ballast and also to encourage zemindars to preserve and submit for inspection any old figures, inscriptions or other curiosities dug up on their estates.

The Secretary added that the Council had submitted Mr. Rivett-Carnae's memorandums to Government with a recommendation that some steps should be taken to carry out his suggestion.

The SECRETARY announced that the Committee of the Oldham Memorial Fund had transferred the sum of Rs. 65-4-9, balance of the fund, to the Asiatic Society's Servants' Pension Fund, and read the following report of the Committee.

*Report of the Oldham Memorial Committee.*

The Oldham Memorial Committee have the pleasure to report that the marble bust of the late Dr. Oldham, by Mr. Geflowski, was received from England in March, 1878, and is considered a good likeness.

The Committee have examined the accounts, as annexed, and find them correct.

As will be seen, there remains a balance of Rs. 65-4-9. The Committee do not think it necessary to consult the subscribers as to its disposal, as the sum is so small, but have added it to the Asiatic Society's Servants' Charitable Pension Fund in the same way as was done with the balance of the Stoliczka Memorial Fund.

The Committee have to warmly acknowledge the valuable services rendered by Dr. Dobson, in arranging for the execution of the bust, and its despatch to India.

J. WATERHOUSE, *Hony. Secretary.*

*Oldham Memorial Fund Account.*

RECEIPTS.

|                                   |     |       |       |     |
|-----------------------------------|-----|-------|-------|-----|
| 1876. By Subscriptions .....      | Rs. | 156   | 0     | 0   |
| 1877. Ditto, .....                | ,,  | 1,068 | 0     | 0   |
| 1878. Ditto, .....                | Rs. | 132   | 0     | 0   |
| By transfer of the amount paid by |     |       |       |     |
| Dr. G. E. Dobson through Messrs.  |     |       |       |     |
| Trübner and Co., London, £ 3 3s.  |     |       |       |     |
|                                   |     | 31    | 8     | 0   |
|                                   |     | <hr/> |       |     |
|                                   |     |       | 163   | 8 0 |
|                                   |     | <hr/> |       |     |
|                                   |     |       | 1,387 | 8 0 |
|                                   |     | <hr/> |       |     |
|                                   | Rs. | 1,387 | 8     | 0   |
|                                   |     | <hr/> |       |     |

## EXPENDITURE.

|                                                                   |     |       |    |   |            |
|-------------------------------------------------------------------|-----|-------|----|---|------------|
| Printing charges,.....                                            | Rs. | 11    | 0  | 0 |            |
| Advertising ditto,.....                                           |     | 14    | 8  | 0 |            |
|                                                                   |     |       |    |   | 25 8 0     |
| Advertising charges,.....                                         |     | 9     | 4  | 0 |            |
| Remitted to Dr. G. E. Dobson £50, .....                           |     | 592   | 9  | 6 |            |
| Ditto ditto, £52,.....                                            |     | 594   | 4  | 8 |            |
| Repaid to the Asiatic Society, balance of cost of pedestal, ..... |     | 87    | 12 | 9 |            |
|                                                                   |     |       |    |   | 1,283 14 6 |
| Landing charges, &c., .....                                       |     |       |    |   | 12 12 9    |
|                                                                   |     |       |    |   | 1,322 3 3  |
| Balance in hand,.....                                             |     |       |    |   | 65 4 9     |
|                                                                   | Rs. | 1,387 | 8  | 0 |            |

DR. HOERNLE read the following letter from Lt.-Colonel G. E. Fryer.

“ In a note on page xiii, of the Preface to his ‘ Dictionary of the Páli Language,’ the late Professor Childers records the following :

“ The authorship of the well known stanza asserting Páli to be the ‘ original language is still unknown. Turnour (Mah. xxvii,) says it ‘ comes from the Payoga-siddhi, a grammar of the fourteenth century ; but ‘ this is a mistake, for on examining a MS. of that work I find the stanza ‘ is merely referred to, the first páda only being quoted. It may possibly ‘ be in Moggallâna Vyākaraṇa, a twelfth century work, but I am inclined ‘ to think it yet older. I venture to quote it here.

sâ Mâgadhî mûlabhâsâ narâ yây’ âdikappikâ

brahmâno c’ assutâlâpâ sambuddhâ câpi bhâsare ;

‘ which means ‘ the Magadhese is the original language in which men of ‘ former ages and Brahma angels, and those who have never heard speech, ‘ and supreme Buddhas speak.’ ”

With reference to the foregoing I have to state that the stanza occurs in the Rúpasiddhi—a commentary on Kaccâyana’s grammar—in the comment on the first sutta of the second—or Náma—book, which is as follows :—

§ 1. jīnavacana-yuttam hi.

adhikāro ’yaṃ ; tattha pañcamāre jītavā ti jīno ; buddho ; jīnassa vacanam jīnavacanam ; tassa jīnavacanassa yuttam, jīnavacanayuttam, tepitakassa buddhavacanassa mágadhíkāya sabhāvaniruttiyā yuttam anurūpaṃ evātidam adhikārattham veditabham.

sá mágadhamúlabhásá nará yáy’ âdikappiká

brahmāno c’ assutâlâpâ sambuddhâ câpi bhâsare.

adhikāro pana tividho, sīhagatika-maṇḍukagatika-yathānupubbika-vasena ; ayaṃ pana sīhagatiko pubbāparavilokanato, yathānupubbiko y-eva vā. Sakkaṭavisadisam katvā jīnavacanānurū-

§. 2. pavasena pakati ṭhapanattham paribhāsam āhalingaṇ ca nippaccate.

\* \* \* \* \*

“ The author of the *Rūpasiddhi* was Dīpaṅkaro, otherwise called Buddhapiyo ; he was a disciple of Ānanda, who was a disciple of the grammarian Moggallāna, otherwise called Saṅgharakkhita Thera. Moggallāna lived in Ceylon during the reign of Parākrama bāhu I., 1153-1186 A. D. The *Rūpasiddhi* therefore could hardly have been written earlier than the thirteenth century A. D.”

The following papers were read :—

1. *Rough Notes on the Distribution of the Afghan Tribes about Kandahar*.—By LIEUT. R. C. TEMPLE, 1st Goorkhas.

(Abstract.)

This is a very interesting paper on a subject on which every additional information must be welcome, especially at the present time. Another paper on the subject is promised by the author. The information contained in the present paper was collected by him, while he was employed in foraging in advance of General Stewart's Division during the march back from Kelāt i Ghilzai to Kandahar and afterwards in taking a convoy of camels to Col. Patterson's reconnoitering expedition down the Arghisān Valley (1st to 23rd Feb.) The author found that nearly all the Afghans living in the Kandahar district are Durānis of the Popalzais and Bārakzai sections, divided into numerous septs. Of these a correct list is given supplementing the imperfections of the official one. He accounts for the frequent discrepancy in the names of the Afghan villages by the circumstance constantly met with by him, that they may be called by six different names which may be either (1), its own name, or may be (2), taken from the district or tract of land in which the village lies, or (3), from the section, or (4), subsection of the tribe which inhabits it, or (5), from the late owner, if recently dead, or (6), from the present owner.

This paper will be published in the Journal, Part I.

2. *Bulandshahar Antiquities*.—By F. S. GROWSE, ESQ., C. S., M. A., C. I. E.

(Abstract.)

The town of Bulandshahar is so called after the high artificial hill on which stood the old Fort. Its original name was *Baran*, apparently an

abbreviation of *Ahibaran*, meaning, according to the author, "snake fort," and conjectured to have been originally a stronghold of the Nága tribe. Of its early history, however, little trustworthy is known. Gold coins, bearing Greek and Páli inscriptions, which not unfrequently used to be washed down in the rains from the high ground of the old city, show that the place at that remote period was one of considerable wealth and importance. At the time of Mahmud's invasion, in 1017, it was the seat of a Dor Raja, by name *Har Datt*. In 1194, Chandra Sen, the last of his descendants, was killed while defending the fort against the army of Sahab ud dín Muhammad Ghori. Under the Muhammadan rule every memorial of their Hindu predecessors has gradually disappeared. After a search over every part of the district, the author was only able to discover a stone bearing two inscriptions, and a few fragments of pillars and doorjambs. The inscription contains a partly illegible date, which Dr. Rájendralála Mitra in a note contributed on the subject, conjectures to be Samvat 1180 (A. D. 1124). Most of the pillars are ascribed by Mr. Growse to the time of the Dor Rajas, in the early part of the 11th century.

Mr. H. H. LOCKE made some remarks on the pillars, and said it would be of great interest to know how the author of the very interesting paper which had just been read had arrived at his conclusion as to the date of these pillars. There was no gainsaying the evidence of inscriptions—and it was more than probable that Mr. Growse had evidence as strong as an authentic inscription in support of the date which he assigned to the carvings—but Mr. Locke, judging from other examples, would have named a later date for these than Mr. Growse does, and therefore thought it would be very interesting and important to know how the latter gentleman had arrived at his conclusion.

The paper, with Dr. Mitra's note, will be published in the Journal, Part I.

3. *Note on some Mammals from Gilgit collected by Major Biddulph.*—

By W. T. BLANFORD, Esq., F. R. S.

This paper will be published in the Journal, Part II.

4. *Notes on a Donative Inscription from Rajaurgarh near Alwar.*—By

RÁJENDRALÁLA MITRA, LL.D., C.I.E.

Bábu Harischandra of Benares has forwarded to me a facsimile of an inscription lately discovered in the neighbourhood of Alwar, together with a Nágarī transcript. The locale where the record was found and the circumstances connected with its discovery are thus described by the Bábu in his letter to me. He says, "In Rájgarh Parganah there is an inacces-



sible hill at a distance of forty miles south-west of Alwar. The hill abounds with tigers and wolves, which have been for a long time so little molested that they do not hesitate to attack men even in day-light. On the upper part of the hill some relics of an ancient city are still traceable, but it is now the site of a small village called Rajaurgarh. There are many wells in the land, which are not circular as those of the present day are, but generally of a square form, and water rests in them at the depth of eight or ten feet below the surface. Several large Buddh idols (which are unimportable) and many Siva lingas still exist there. There is 'a house still existing called the रुसी राजीका महल (*Rusi Rāṇikā Mahal*), or 'the Palace of an incensed Princess' (or Russian Princess?), but there tigers whelp now. Similarly remains of other old buildings are also traceable. A fortification made of stones runs over the hill for many miles. It has a gate known as Āsāvarī gate, with shutters in comparative good order. The gate is named after the goddess Āsāvarī whose temple stands in its vicinity. Just close to it stands the temple to which this *dāna-patra* belongs. There, by the order and at the expense of the Mahārājā of Alwar, five Bráhmans are engaged to offer their continual prayers. The Mahádeva in it is known by the name of Nílakanṭha, because both the Linga and the Jaladhári are made of blue stone. The temple is built in the old style, and the very first view of it shows its antiquity. A cowherd by chance got the inscription stone, and, thinking it to be a *bijak* of some money hidden under ground, because persons happened to get some old coins there, made it over to the Tahsildár of Rájgarh, which is a railway station twenty-four miles to the south from Alwar. The Tahsildár, imagining it to be a new thing, presented it to Thomas Cadell, Esq., V. C., the political agent at Alwar, who, with a view to get it read, sent it to Paṇḍit Rúpanáráyaṇa, a member of the Ráj Council. The Paṇḍit, seeing the characters written with *anusvaras* and *visargas*, took it to be a Sanskrita Inscription; but he could not make it out, and returned it back, saying it was written in Maithila characters, and none but a Maithil could read it.

"By chance my friends, Paṇḍits Bhavánand, Śrídhar, Udayánand and Rámchandra, four brothers, had been to visit the agent, who asked them whether they had seen the inscription stone? They replied that they had seen Paṇḍit Chanchal Jhá and Jagannáth Daftarí sitting outside the bungalow, and trying to make out the inscription; but that they had not examined the inscription with a view to read it. The agent told them that as yet nobody had been able to read it, but he hoped that they would succeed. When they came outside, and saw the inscription stone, they found the mátrás similar to those of other Sanskrit writings; but the mode of writing was quite different to that of the present day. The inscription being writ-



ten in Sanskrit, they could read it out, and they explained the purport of it to the agent, who was very glad to hear it, and requested them to translate it into English, and, if possible, to take a print of it. Accordingly they took the inscription home, took a print of it, and translated it into English; both of which they gave over to the agent. The agent is at present at Udaypur. It is not known whether he has sent these to any press or not.

“The stone is at present with the above named Paṇḍits. It was found in the month of Magh, 1933 Samvat.”

The inscribed face of the stone measures 24 × 17 inches, and contains 17 lines of Sanskrit in the Kuṭila character. The record opens with the name of the paramount sovereign Vijayapāla Deva, son of Kshitipāla Deva, during whose reign, on Saturday the 13th of the waxing moon in the month of Māgha (January—February), in the Samvat year 1016 = A. D. 1071, it was executed to attest the gift of a village, named Vyāghravāṭika, with its adjoining fields to certain hermits for the worship of a lingam consecrated by the donor's mother Lachchbukā, and named after her Lachchhukeśvara. The donor calls himself Śrī Mathana Deva, son of the Mahārāja and Adhirāja Śrī Sāvata, of the Śrīhara clan of Gujjara.

The fact of the donor's giving away a village in the neighbourhood of Alwar, would imply that he was, in the fourth quarter of the 11th century, a ruler of that part of the country, and his capital was named Rājyapura, the modern Pargana of Rājgarh. He lived under the supremacy of the paramount sovereign Vijayapāla; but no information is vouchsafed regarding that sovereign. It is well known, however, that for three centuries or more, the Pāla kings of Gwalior exercised supremacy over a large tract of country, including a portion of the Doab and parts of Rajputānā, and it is probable that one of these was the sovereign referred to. In Père Tieffenthaler's “Description of India,” a long list is given of these Pāla Rājās, and the 67th of the list is named “Bedjepāl;” but he is said to have reigned at a much earlier date than 1078 A. D., and his father's name was “Tilek-pāl.”

At the close of the grant there is a supplementary sanad by which certain market tolls are assigned for the benefit of the temple aforesaid and of some others in its neighbourhood. The assignments include a toll of 2 Vis for every bag of goods, 2 Palas of oil or ghi for every jar or leather bottle of those articles, 2 Vis for every stall or shop, and 50 leaves for every Chollika coming to the market from outside the boundary of the village. The *pala* is a well-known liquid measure of a little over two ounces; but what the *vi* (वि) is, I cannot make out. It appears to me to be very like an abbreviation of *viśvā* or “twentieth;” but it cannot imply the twentieth of the merchandise brought for sale, for 2 *vis* would amount to ten per cent., a

large percentage to be assigned for the use of the temple, and quite out of keeping with the two and a half ounces of oil per jar. It could not, besides, apply to stalls and shops, for it would be absurd to suppose that a ten per cent. toll was levied on shops every month. At that rate the whole of the shop would disappear in 10 months. Some current coin is evidently meant, and if we take it to be the twentieth of a rupee or a five-pice piece, it would be near the mark. But I am not aware of any such coin having been current in the 11th century.

I am equally at fault about the meaning of the word *Chollika*. The word does not occur in any Sanskrit dictionary. The word *chulli* means "an oven," "a hearth," or "a funeral pile," but such things can form no part of a market, nor can there be any consistency in asking the owner of a hearth, or the leader of a funeral procession, to pay 50 leaves. I think the word implied an aboriginal or wild man of the woods, and every wild man who brought *shál* leaves for sale had to give 50 leaves for the use of the temples. Such leaves are brought by thousands to every market in the North Western Provinces in the present day, and used partly for packing small parcels, serving in this respect the purposes of brown paper of European grocers, and partly for eating from, the poorer classes not being able to afford metal plates, and earthen platters; which, according to Hindu custom, cannot be twice used for eating rice, are always expensive and cannot be kept clean for repeated use.

*Translation of a Sásana from Rajaurgarh near Alwar.*

Salutation to Śrīmán Rámánuja. Om! may it be auspicious. On Saturday, the 13th of the waxing moon in the month of Mágha, in the Samvat year one thousand and sixteen (in figures) S. 1016 Mágha, Sudi 13, Sani, in the prosperous and auspicious kingdom of his excellent majesty Mahárāja and Adhirāja, Lord Vijayapála Deva, the successor of his excellent majesty the Mahárāja and Adhirāja, Lord Kshitipála Deva. On this day the prosperous lord of Rájyapura Śrī Mathana Deva, son of the great king and king of kings, Śrī Sávata, of the Śríhara clan of Gujjara, to the officers of state, whether hereditary or temporal, and to the inhabitants, including wealthy merchants, jewellers and others, high and low, assembled in the village of Vyághraváṭaka, accords due greetings, information, and orders. "Be it known unto you, that knowing the body, wealth and life to be as unstable as drops of water at the points of grass-blades, and all worldly pleasures to be worthless; knowing also the immortality of good name and reputation; we have, for the augmentation of the virtue of our parents and of ourselves, and for our weal in this world as well as in the next, as also with a view to cross the worldly ocean, and to remove all

barriers from our way to heaven ; for the daily ablution of the image of Mahádeva, named Lachchhukeśvara after our mother Śrī Lachhuká ; and in order to furnish him with sandal, flower, incense offering, lamp, drink and minium ; for the reparation of the image and for its supervision ; and to furnish it with holy thread, and for the salary of the porters and servants attached to the establishment ; on this auspicious day of the consecration of the divinity, after performing due ablution and touching water, granted, in due form in an engraved record, without any reservation, the aforesaid village of Vyághraváṭaka, along with all its environs, pastures, trees, and reservoirs of water, along with the right of exacting the usual shares of the produce and alms-share, as also the right of collecting the revenues, such as fines, the fixed rates, the property of those who die without heirs, along with the adjacent fields of Gujjara. Knowing this, from this day and as long as the sun and the moon will endure, let the unmolested charge of worshipping the divinity in the auspicious temple of Rájyapura remain with the pupils and their disciples of Śrímán Onkára Śiváchárya of great renown and popularity, a regular performer of Vedic rites, disciple of Śrírúpa Śiváchárya, the pupil of Śrī Kanṭháchárya, of the temple of Gopála Devi Tadágapali, and the pupil of Sopuriya family, descended from Śrímán Aínar-daka. And let this grant be upheld by all future sovereigns, whether born in our family or of other dynasties who may reign here. They should not at all act detrimentally to this ; on the contrary they should, in compliance with our behest, uphold this our pious act, for they too will thereby derive from it a share of virtue, for it has been said by Bhagaván Vyása, the digester of the Vedas, ‘By Sagara and many other kings the world has been ruled ; to whomsoever the land belongs for the time being, to him belongs the merit of gifts of land. Áditya, Varuṇa, Váyu, Brahmá, Vishṇu, Hutásana and Mahádeva congratulate and regard with favour the donor of land. The donor of land lives in heaven for sixty thousand years, while the revoker of the same and the abettor thereof dwell for a like period in hell. Those virtuous people who aspire to fame, white and stainless as the moon, or long for the blandishments of celestial nymphs, never resume grants made by others, for they think the upholding of grants to be even more commendable than making such grants.’ ” This grant was made by the king himself ; it was put in writing by his son ; it was proclaimed by Suraprasáda, and engraved by Hari.

Moreover, for the divinity above mentioned, for the four guardian divinities (Kuliká)\* around him, and for Vináyaka established within the city,

\* Eight classes of Nágas are usually invoked as guardian divinities, and the Kulikas are one of them.

market tolls are to be assigned at the rate of 2 Vis,\* as customary in hāts, for every bag of goods ; 2 Palas† for every jar or leather bottle (*Kúpaka*) of oil or ghi ; 2 Vis per month for every stall or shop ; and 50 leaves for every Chollika‡ coming from outside. This is the edict of Deva Mathana. Salutation to Rámachandra.

*Transcript of an inscription from Rájaurgarh prepared by Pandit Bhavánand and his brothers.*

श्रीमते रामानुजाय नमः ॥ ॐ स्वस्ति ॥

- १ । परमभट्टारकमहाराजाधिराजपरमेश्वरश्रीचितिपालदेवपादानुध्यातपरमभट्टारकमहाराजाधिराजपरमेश्वर—
- २ । रश्रीविजयपालदेवपादानामभिप्रवर्द्धमानकल्याणदिजयराज्ये संवत्परमतेषु दशसु चोद-  
शोत्तरकेषु सा—
- ३ । समाससितपञ्चवयोदश्यां अनियुक्तायामेवं सं १०१६ माघशुद्धि १२ शनावद्य श्रीराज्य-  
पुरावस्थितो महाराजाधिराज—
- ४ । परमेश्वरश्रीमथनदेवो महाराजाधिराजश्रीसावटसूनुर्मुर्जरश्रीहाराज्यः कुमली । स्व-  
भोगावाप्तवंशपातकभोगसम्बद्ध—
- ५ । व्याघ्रवाटकग्रामे समुपगतान् सर्वानेव राजपुरुषाभियोगस्थान् क्रमानामिकाभियुक्त-  
कानियुक्तकांस्तन्निवासिमहत्तरमहत्तम—
- ६ । वष्टिक्प्रवष्टिप्रमुखजनपदांश्च यथार्हं मानयति बोधयति समादिशति चास्तु वः  
संविदितं ह्येषांलघुजलविन्दुसंस्थाना—
- ७ । स्थिराणि शरीरसम्पत्कीवितानीतीमां संसारासारतां कीर्तिमूर्तेश्च कल्पस्थायितां  
ज्ञात्वा मातापिचोरात्मनश्च पुण्ययशोऽभिष्ट—
- ८ । जये रेचिकामुष्मिकफलमिमित्तं संसारार्णवतरणार्थं स्वर्गमार्गार्जलोद्घाटनहेतोः स्वमाह-  
श्रीलङ्कुकामाया श्रीलङ्कुकेश्वरम—
- ९ । चादेवाय प्रत्यहं रत्नपनसमालभनपुष्पधूपनैवेद्यदीपतैलसुधासिन्दूरलागनस्यस्फुटित-  
समारचनप्रेक्षणकपविचका—
- १० । रोचककर्मकरवाटिकापालादिव्ययार्थमुपरिस्त्वचितव्याघ्रवाटकग्रामः स्वसीमादृश्यति-  
गोचरपर्यन्तः मोक्षार्थः सदृशमा—

\* Ante, p. 159.

† Equal to 6 tolas in weight.

‡ Ante, p. 160.

- ११ । साकुलः सखलो भोगमयतादायाभ्यामपि समस्तसस्यानां भागसलभिचाप्रस्यकस्तन्वक-  
मार्गकदष्टदशापराधदाननिधिनिधा—
- १२ । ना पुनिकधमनष्टिभरटोचितानुचितनिबदानिबदसमस्तप्रत्यादायसहितस्यैतत्प्रत्या-  
सन्नश्रीगुर्जरवाहितसमस्तचेचसमेतसाक्षि-  
१३ । त्प्रपाद्योऽस्य पुण्येऽहनि स्नात्वा देवस्य प्रतिष्ठाकाशे उदकपूर्वं परिकल्प्य भासनेन  
दत्तो मलैवमद्यदिनादारभ्य श्रीमदामर्दकविनिर्गतश्री—
- १४ । सोपुरीयसक्त्यां श्रीष्वाचमिवे श्रीमोपासीदेवी तङ्गामपासीमठसम्बद्धश्रीराज्यपुरे श्री-  
नित्यप्रमुदितदेवमठे श्रीश्रीकणाचार्यशिष्यश्रीरू—
- १५ । पश्चिवाचार्यसन्निध्यश्रीमदोङ्कारशिवाचार्यस्यास्त्रलितप्रज्ञाचर्यावाप्तमहामहिम्नः परम-  
यशोरामेः शिष्यप्रतिशिष्यक्रमेण देवो—
- १६ । पयोमार्थं तन्निमज्जवन्देदेनाचन्द्रार्कं यावत्कुर्वतः । कारयतो वास्यदंशजैरन्वतरैर्वा-  
भाविभिर्भूपासैः । कालकाशेष्वपि परिपन्थना—
- १७ । न कार्य्या प्रत्युतास्तत्तत्प्रार्थनया तत्र सानाथं वोढव्यं । यतः समानैवेयं पुण्यफला-  
वाप्तिरनुमन्तया । उक्तञ्च भगवता प—
- १८ । रमर्षिणा वेदवासेन । बडभिर्वस्तुधा भुक्त्वा राजभिक्षुमगरादिभिः । यस्य यस्य यदा  
भूमिस्तस्य तस्य तदा फलम् ॥ आदित्यो वर—
- १९ । सो वायुर्गङ्गा विष्णुर्जताग्रनः । भगवान् शूलपाणिश्च अभिमन्दन्ति भूमिदम् ॥ षष्टि-  
वर्षसहस्राणि स्रमे तिष्ठति भूमिदः । आग्नेना चानुम—
- २० । ना च तान्येव नरकं वसेत् ॥ यैर्वाञ्छितं शिशिरदीधितिशुभकीर्तयैश्चामरप्रलयिनी  
परिरम्भस्य । ते साधवो न हि हरन्ति परेष्वद—
- २१ । तां दानाददन्ति परिपालनमेव साधु ॥ भासमं कृतवान् देवो लिखितं तस्य  
स्त्रमुना । यत्तं स्त्ररप्रसादेन उत्कीर्णं हरिणा तत इति ॥
- २२ । तथामुसौ देवाय पार्श्वं । देवकुलिकाचतुष्टया ४ । राजधान्यां प्रतिष्ठितविनायक-  
सहिताय । इष्टदाने गोर्षीं प्रतिचष्ट्यावहारिकविं । २ । घटककूपकं प्रति दृ—
- २३ । तस्य तैलस्य च पलिकद्वे । २ । वीथीं प्रतिमासि । २ । विं । २ । तथा वह्निःप्रविष्टचेन्निकां  
प्रति पर्शानां । ५० । इतदेवस्य कृतमिति श्रीमद्यन ॥ \* ॥

The following communication has been received—

*Description of some new species of Hydroid Zoophytes from the Indian Coasts and Seas.*—By DR. J. ARMSTRONG, Marine Survey Dept.

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The following additions have been made to the Library since the Meeting held in April last.

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No. 1375. *Barff.*—The Treatment of Iron to prevent Corrosion.—Observations on Injurious Insects.

No. 1376. *McBean, S.*—The Practicability and Advantage of a Ship Canal through the Island of Ramiseram, between India and Ceylon.

New Haven. American Journal of Science and Arts,—Vol. XVII, No. 97, January 1879.

*Edison, T. A.*—Use of the Tasimeter for Measuring the Heat of the Stars and of the Sun's Corona. *Greene, D.*—Paper Dome for an Astronomical Observatory.

Paris. Annales de Chimie et de Physique,—Tome XVI, January, February and March 1879.

January. *Breguet, A.*—Recherches sur la théorie de la machine de Gramme sur la cause de la position dissymétrique de ses frotteurs, et, incidemment, étude des écrans magnétiques. *Edlund.*—Recherches sur l'induction unipolaire, l'électricité atmosphérique et l'aurore boréale.

February. *Grandeaux, L.*—De l'influence de l'électricité atmosphérique sur la nutrition des végétaux. *Becquerel, H.*—Mémoire sur les propriétés magnétiques développées par influence dans divers échantillons de nickel et de cobalt comparées à celles du fer.

March. *Schutzenberger, P.*—Mémoire sur les matières albuminoïdes. *Husson, C.*—E'tude sur le café, le thé et les chicorées.

Paris. Comptes Rendus, Tome LXXXVIII, Nos. 9—13.

No. 9. *Bechamp, A.*—De l'influence de l'oxygène sur la fermentation alcoolique par la levûre de bière. *Certes, A.*—Sur une méthode de conservation des Infusoires.

No. 11. *Cazeneuve, P.*—Sur le dosage de la glycose dans le sang. *Feltz, V.*—Recherches expérimentales sur un *Leptothrix* trouvé, pendant la vie, dans le sang d'une femme atteinte de fièvre puerpérale. *Tacchini.*—Sur des particules ferrugineuses observées dans la poussière amenée par un coup de vent de siroco en divers points de l'Italie.

No. 12. *Berthelot.*—Sur les changements lents que le vin éprouve pendant sa conservation. *Chamberland, Ch.*—Résistance de certains organismes à la température de 100 degrés; conditions de leur développement. *Poincaré.*—Sur la présence dans le sang et les tissus, sous forme sphéroïdale, de certains liquides non miscibles à l'eau et ayant pénétré par la voie pulmonaire.

No. 13. *Boileau, P.*—Nouveau procédé pour le jaugeage des rivières.

———. Journal des Savants,—February and March 1879.

———. Revue Critique,—Vol. VII, Nos. 9, 11, 12, 13 and 14.

———. Revue des deux Mondes,—Vol. XXXII, Livraisons 2 and 3.

———. Revue Scientifique,—Vol. XVI, Nos. 36—41.

No. 36. La Nature Tropicale d'après M. Wallace. L'appauvrissement de l'Inde—Réponse à M. Hyndman.

No. 40. *Vogt, C.*—Les migrations des animaux, dans leur rapports avec la distribution géographique ancienne et actuelle.

No. 41. Les chemins de fer dans l'Asie Centrale. *Galeb, O.*—Les oxyuridés parasites des insectes.

### BOOKS PURCHASED.

BAIN, A. Education as a Science. 8vo., London, 1879.

CUSHING, J. N. Grammar of the Shan Language. 8vo., Rangoon, 1871.

HÆCKEL, E. The Evolution of Man, 2 Vols. 8vo., London, 1879.

HUGEL, C. Travels in Kashmir and the Punjab. 8vo., London, 1845.

SLEEMAN, W. H. A Journey through the Kingdom of Oude in 1849-50, 2 Vols. 8vo., London, 1858.

SLOAN, W. H. A Practical Method with the Burmese Language. 8vo., Rangoon, 1876.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR JUNE, 1879.

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The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th June, at 9½ o'clock P. M.

Dr. S. B. PARTREDGE, in the Chair.

The minutes of the last Meeting were read and confirmed:—

The following presentations were announced—

1. From F. S. Growse, Esq., 4 coins (see p. 173).
2. From the author, W. L. Distant, Esq., copies of the following papers:

Notes on some *Hemiptera Homoptera*.

Description of new Species of *Hemiptera Homoptera*.

The Inhabitants of Car Nicobar.

Our present knowledge of the Nicobarians.

Eastern Coolie Labour.

On *Hemiptera* from the N. E. Frontier of India.

3. From the Home Department.—The Life of John Wilson, D. D., F. R. S. By George Smith.

4. From the Bengal Secretariat.—Papers relating to the Collection and Preservation of the Records of Ancient Sanskrit Literature in India. By A. E. Gough.

5. From the Batavian Society of Arts and Sciences.—

Catalogus der Bibliotheek van het Bataviaasch Genootschap.

Verslag der viering van het Honderd-jarig Bestaan van het Bataviaasch Genootschap.

Kawi Oorkonden, Inleiding en transcriptie, by A. B. Stuart.

Gedenk Boek, by J. H. der Kinderen.

Wiwaha Djarwa en Brata Joeda Kawi. R. Th. Friederich.

A Medal commemorative of the 1st Centenary of the Society.

6. From the author.—Note on Elephants, and the transporting of them by Railway. By Captain H. W. Clarke, R. E.

7. From H. K. S. Arnold, Esq.—History of the Rise and Progress of the Bengal Army, Vol. 1. By Captain A. Broome.

The following gentlemen nominated by the Council at the last Meeting were balloted for and elected Honorary Members.—

Professors E. B. Cowell, J. Renaud and H. Milne-Edwards and Drs. J. Janssen and A. Günther.

The following is a candidate for ballot at the next meeting—

M. Finucane, Esq., c. s., Settlement Officer to the Court of Wards Raj Darbhanga, Madhubani, proposed by G. A. Grierson, Esq., c. s., seconded by Dr. A. F. R. Hoernle.

The CHAIRMAN announced that the Council propose the following amendment to Rule 14*e*; that, instead of the words, "As to the time of returning books &c.," the words: "for the use and general management of the Library," should be substituted.

The object of the amendment would be seen from the following circular which had been issued to all resident members, and he invited discussion from the members present, reminding them that under the rules a statement of any objections would have to accompany the voting papers which would be sent to all members of the Society, and stated that the question would come up again for final settlement at the August Meeting.

"In accordance with Rule 64*a* the Council beg to announce that they will propose to the Society at the General Meeting in June the following amendment to rule 14*e*; that, instead of the words "as to the time of returning books &c.," the words: "for the use and general management of the Library," should be substituted. The first paragraph of the rule will then read thus:—

*"To take out books, plates, drawings and manuscripts from the Library, subject to such restrictive regulations in the case of rare and valuable books, manuscripts, &c., and to such Rules for the use and general management of the Library as may be prescribed by the Council under Rule 48, Clause (a)."*

"Instead of

*To take out books, plates, drawings, and manuscripts from the Library, subject to such restrictive regulations in the case of rare and valuable books, manuscripts, &c., and to such Rules as to the time of returning books, &c., as may be prescribed by the Council under Rule 48, Clause (a)."*

"The Council propose this amendment because a Member of the Society has raised the question whether the Council have the power, under rule 48*a*, to enforce the Library byelaw that Members shall not be allowed to take out new books and periodicals

until the expiration of a month after their receipt ; such byelaw being, in the opinion of the Member in question, an infringement of the privileges of Membership under Rule 14e.

“ It is obvious that, although the Rule 14e does not actually define the power of the Council to prescribe restrictive regulations as to the *issue* of ordinary books and periodicals, the spirit of the Rule, in conjunction with Rule 48a, is, that the Council are to frame such regulations as seem to them desirable for the proper management of the Library, in the interests of the Society.

“ The Council have under consideration the desirability of reducing the time that weekly periodicals shall remain on the Library table, to a fortnight. They would, however, remind Members that the Society's Library is essentially a Library of reference. The Society have not the means, nor is it an object, to make it fulfil the functions of a Circulating Library or Book Club. The Council are desirous of furthering the convenience of Members as far as possible in making use of the Library ; but, in view of the great risk of loss that is run in letting out unbound numbers of serial periodicals and scientific Journals, and the difficulty of replacing many of them, if lost, the Council are of opinion that the facilities for taking such from the Library should be restricted as far as possible.”

In reply to questions from some of the members present as to whether it was to be inferred from the last paragraph of the Notice that the Council proposed to restrict the privileges of members in taking books and periodicals from the Library, the Chairman explained that the Council had no such intention, that the object of the paragraph was to remind Members of the Society that their Library was distinctively one of reference, and that therefore it was of the highest importance to preserve their series of scientific journals as perfect as possible, and to appeal to Members to bear this in mind in making use of the Library, because the breaks in series caused by the losses that would probably be entailed upon the Library by attempting to use it as a Book Club greatly impaired the special value of the Library and were exceedingly difficult to make good.

After some discussion, the meeting unanimously approved of the proposed amendment.

The COUNCIL announced that Mr. J. C. Douglas had been appointed a member of the Finance Committee and Major H. S. Jarrett of the Philological Committee.

The SECRETARY reported that Mr. W. A. Bion had been confirmed in his appointment as Assistant Secretary.

Dr. HOERNLE exhibited and described four coins, kindly presented to the Society by F. S. Growse, Esq., Magistrate of Bulandshahar. They were

found in Bulandshahar on the site of its old Fort, some account of which has been given by Mr. Growse in his paper on the Bulandshahar Antiquities (see Proceedings, Bengal Asiatic Society for May 1879). Two of the coins are Indo-scythian copper coins; the other two are early Hindu gold coins. Of the former, one is a round specimen of the well-known coins of Kadphises, with the head of king Hermaeus on the obverse and a standing Hercules on the reverse (see Wilson's *Ar. Ant.*, V, 9; XI, 10). The inscription, on both sides, is too much worn to be decipherable. The other Indo-scythian coin is also a round one and belongs to Azes. It is an exact counterpart of the specimen figured in Wilson's *Ar. Ant.*, VII, 17. The obverse has the king on horseback, the reverse a standing Minerva, both turned to the right. Of the two gold coins, one is a specimen of the so-called "second series of Link-coins" of Prinsep. It is in fairly good preservation. On the obverse, there is the standing figure of the king, turned to the left, dressed in a suit bedecked with jewels and consisting of a tiara with the regal fillet, short coat with pendent sleeves, and trowsers. There is a nimbus round the head; the right hand points downwards to a small fire-altar; the left arm is raised, its hand resting on a spear or standard with pennons. Over the right hand and the fire-altar there is a trident with pennons. To the right of the fire-altar, and between it and the foot of the king, there is a small mark, looking like the letters *chi* in ancient Nāgarī. Between the feet of the king there is a row of dots or minute marks and above it some mark, which is almost entirely gone and now quite undistinguishable. Both these marks may be seen on the coin figured in Prinsep's *Ind. Ant.*, XXIX, 10 (ed. Thomas). In some of the coins of the preceding series (of Vasudeva?) in the cabinet of the Society the place of the *chi*-mark is occupied by the initial P of PAO, and that of the illegible mark by the final O of KOPANO. This circumstance may have been the origin of the marks on the present coin. Below the left arm, and between the body of the king and the staff of his spear, there are the letters *si*, quite distinct, in ancient (Gupta) Nāgarī; and below them some letter, looking like *ka*, but partly destroyed. On the other side of the staff, between it and the rim, there are, in large, very distinct Gupta characters, the letters *shaka* or *shake* arranged Chinese-fashion (𑂔 or 𑂕). Along the rim, there runs a circle of small, connected rings. On the reverse there is a draped female figure sitting on a high-backed, four-legged throne, looking to the front, holding a cornucopia in her left and the royal fillet in her right hand; her hair is dressed with jewels, and round the head there is a nimbus. On the right, between the frame of the throne and the rim, there are four very rudely cut letters, which seem to bear a faint resemblance to the Greek characters PΔOX, which would be a remnant of the word APΔOXPO or



αρδονπο, that is *ardhavira* or the half male, half female Śiva (Parvati). The letters are evidently meant as mere ornament, and badly imitated, without understanding, from the corresponding Greek legend on Indo-Scythian coins. The real legends of the coin are not Greek, but Indian. There is no monogram on either side. Neither in Prinsep nor in Wilson is there figured any coin exactly resembling this one. The copper coin, in Prinsep, XXXI, 4, is the nearest to it. Prinsep (Vol. I, p. 387) reads the legend on the obverse, *maka*.

The other gold coin is one of the so-called Gupta series and belongs to Chandragupta II. There is no specimen exactly like it, in either Prinsep or Wilson. Those nearest are Prinsep, XXX, 9, and Wilson, XVIII, 4. But on the present coin, on the obverse, the king is turned to the right, looking at his bow, while his right arm is raised, the hand holding some indistinct object; the inscription is *Deva śri mahārājādhirāja*; no monogram. The reverse is exactly like that on Prinsep, XXX, 9.; viz., Lakshmi, sitting on a lotus; left hand pointing downwards, right hand holding the royal fillet; legend *śri vikrama*; monogram.

The following papers were read—

1. *Description of some new Species of Hydroid Zoophytes from the Indian Coasts and Seas.*—By DR. J. ARMSTRONG. \*  
(Abstract.)

This paper contains descriptions of the following new species. *Lafoëa elongata*, found at Pigeon Island and Konkan Coast, also at Diamond Island off the coast of Pegu; *Halicornaria setosa*, found off Cape Negrais in 80 fathoms, Cheduba Island in 8 to 10 fathoms, off the Terrible Islands in 25 fathoms, and off Cape Comorin in 40 fathoms; *Halicornaria plumosa*, found off Cape Comorin in 35 to 40 fathoms, and off Cheduba Island in 10 to 15 fathoms; *Thimaria compressa*, found in abundance off Diamond Island and on the Konkan Coast, also off Cape Comorin; *Antennella allmanni*, found off Cape Comorin in 50 fathoms and off Cheduba Island in 8 to 10 fathoms; *Sertularella rigosa*, found off Cape Comorin in 40 fathoms and off the Arakan Coast in from 10 to 15 fathoms; *Desmoscyphus humilis*, found on coast of St. George's Island, West coast of India. *Endendrium ramosum*, found off Cape Comorin in 40 fathoms and very sparingly along the coast of Arakan in from 10 to 70 fathoms.

With the exception of a single species, all the above hydroid are calypoblastic. The one exception is *Endendrium ramosum*, which is a typical gymnoblastic zoophyte, and is especially remarkable in having the gonophores borne not upon a true blastic style but upon atrophied hydrantha from which the tentacles have disappeared.

The paper will be published, with plates, in the Journal, Part II.

2. *Notes on the Formation of the Country passed through by the 2nd Column, Tal Chotiali Field Force, during the march from Kala Abdullah Khán in the Khojak Pass to Lugari Bár Khán, Spring of 1879.—By* LIEUT. R. C. TEMPLE.

(Abstract.)

The author commences his paper by describing a remarkable feature to be observed all over South Afghanistan, *viz.*, the peculiar gradual slope or glacis leading up to the foot of the hills which encompass the numerous valleys into which the valley is split up. This slope or glacis is generally very stony and covered with detritus from the hills, and is cut up by wide shallow stony river beds, down which the water rushes with enormous force after every heavy fall of rain. It seems likely, therefore, that the slopes have been formed by excessive denudation going on in the hills in consequence of their bare and treeless condition. But it is also possible that this denudation is helped by the action of frost in the case of hills formed, as many of the ranges are, of a slaty shale which is much disintegrated and split up near the hill tops. The cold at the summits of these hills, which are about 7500 to 8000 feet above sea level, is intense, and the frost separates the shale chips to be washed down by the next shower: the appearance of the hills seems to justify this hypothesis.

The author then goes on to make some remarks on the Metals, Salt deposits, Want of Trees, Fossil remains in the Shor Valley and about the Hanokai and Han Passes, and gives a series of notes on the country along the route followed.

The paper was illustrated with a large collection of upwards of 600 specimens of soils, rocks and fossils collected on the line of march, besides some specimens of pottery, and will be published, with a map, in the Journal, Part II.

Mr. H. B. MEDLICOTT remarks as follows upon Lieut. Temple's specimens :—

"With Dr. Feistmantel's assistance, I have gone through Mr. Temple's specimens, with the following result.

"The fossils are exclusively tertiary, none are post-tertiary. They are mostly nummulitic; possibly all of that age. The supposed lizard (No. 203,) is a detached segment of an echinoderm.

"The rocks are mere fragments, and the great majority of them only weathered pebbles. A very large proportion of them are of such limestone, sandstone and shale as are usual in the tertiary formation.

"There is no fragment of granitic or metamorphic rock, unless 121, which is crystalline limestone, but this may be only a contact rock. The

same may be said of the few specimens (Nos. 35, 44, 48 and 53) of indurated silicious rock, they are of the type common at the contact of eruptive rocks. Some of them are jaspideous. Of trappean rocks there are not a few (Nos. 57, 58, 89, 94, 95, 97, 100, 130, 141, 142, 143, 146, 161, 177, 180, 185, 186) some are syenitic or dioritic (non-quartziferous) and some are earthy amygaloidal.

“The crystalline minerals are the commonest forms of quartz, calcspar and gypsum, one (No. 240) is clear white cubical rock salt.

“There is no metalliferous rock or mineral in the whole collection.”

3. *A Balúchi Vocabulary with an Outline of Balúchi Grammar.*—By  
M. LONGWORTH DAMES, ESQ., B. C. S.

(Abstract.)

The language of Balúchistan is divided into two dialects, the Northern and the Southern. The latter which is also called the Makrání has been lately dealt with in Major Mockler's Grammar. The present work treats of the Northern dialect, which is spoken among the Rind Balúchis living in the neighbourhood of the Bolán Pass, in Kachí and on the Upper Sindh and South Panjáb frontiers. The difference between the two dialects is so great, that the one is almost unintelligible to the tribes speaking the other. Balúchi can hardly be called a written language. It is only within the last few years, that Balúchis have begun to write it, Persian being the ordinary medium of written communication, and the Balúchis considering their language to be merely a colloquial form of Persian. As regards vocabulary, it is a mixed language. The original old Persian stock has formed the nucleus round which the alien elements, principally Sindhi and South Panjábí, have gathered. The present work is the first attempt to compile a full and systematical vocabulary of the Northern dialect; and hereby differs from the accounts of it by Leech in the Journal B. A. S., for 1840, Bruce in his *Manual* (Lahore 1869) and Gladstone in his *Bilúchi Manual* (Lahore 1873).

4. *A Maithili Grammar or the Accidence of the Language of Mithilá (North Bihar); with a brief Chrestomathy compiled from various sources.*  
—By G. A. GRIERSON, ESQ., C. S.

(Abstract.)

Maithilí takes its name from Mithilá, the ancient capital of the modern province of Tirhut or North Bihár, bounded on the north and south by the Himalaya and the Ganges, and on the east and west by the Koši and Gan-  
dak respectively. It is spoken by Hindus and Muhammedans alike; alto-

gether by upwards of 7 millions of people. It is extremely free from admixture of foreign words, being composed mainly of words of Sanskrit origin. It differs from both Hindi and Bengali, its neighbours on the west and east respectively, both in Vocabulary and Grammar, and is as much a distinct language from either as Maráthi or Oṛiya. It is emphatically, a spoken language, possessing no literary work, beyond a history of Kṛishṇa and the songs of Vidyápati Thákur. The materials for the Grammar were obtained by the author partly from lists of grammatical forms supplied by paṇḍits, village gurus, &c., partly they were collected by himself in his intercourse with the natives in cutcherry, &c. The Grammar is divided into 4 Parts, with an Introduction and two Appendices. Part I treats of the Alphabet, Part II, of Nouns, Adjectives and Pronouns, Part III, of the Verb, Part IV, of Indeclinables and Numerals. Appendix I gives a comparative table of Alphabets, and Appendix II, a brief Chrestomathy.

5. *Coins of Khusrau Sháh and Kharran Malik, the Ghaznavi Kings of Lahoré.*—By C. J. ROGERS, Esq., *Principal, Normal College, C. V. E. S., Amritsar.*

(With Plate IV.)

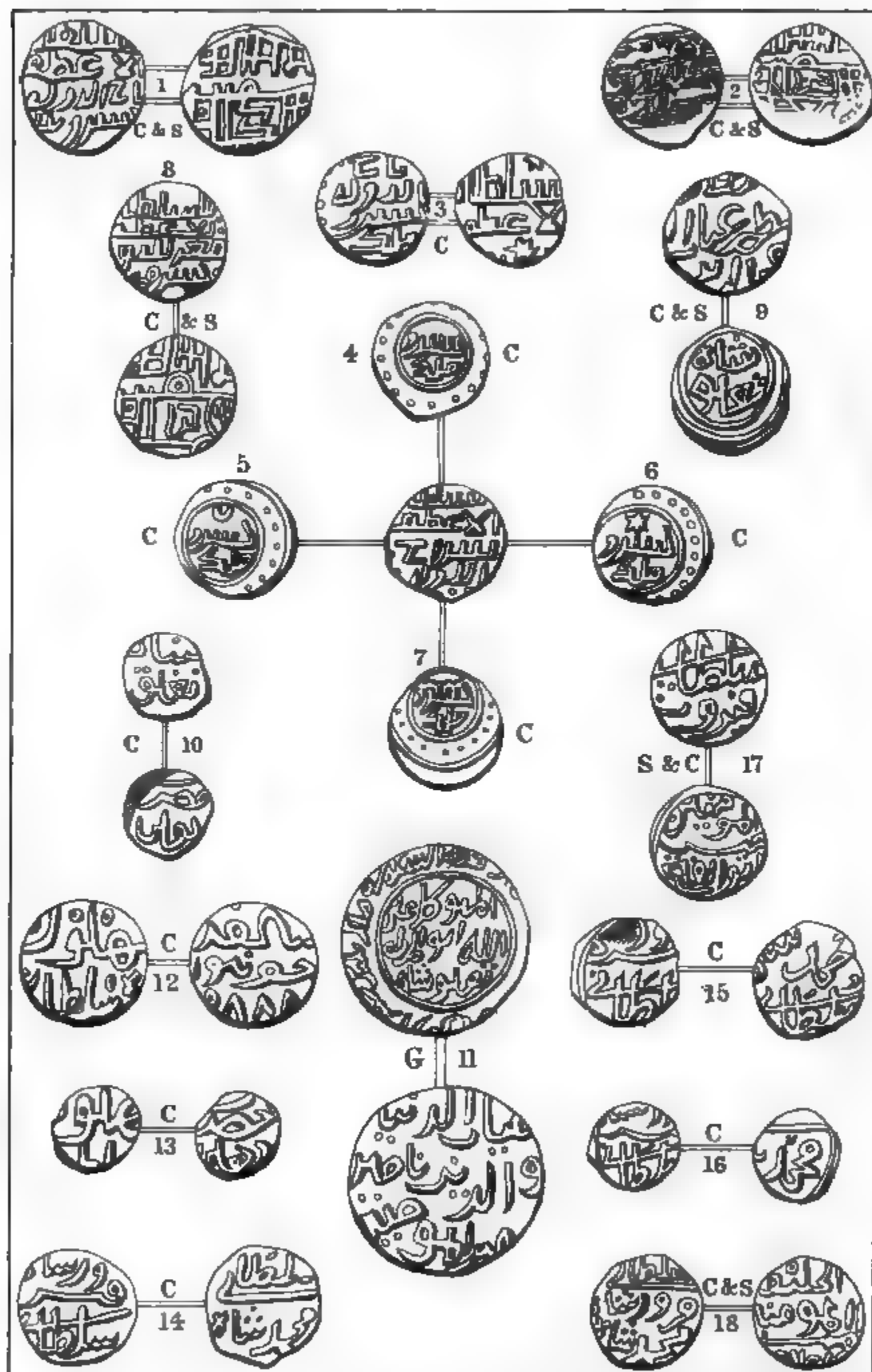
The first Musalman king who took up his residence in India was Khusrau Sháh. The coins of this king are very rare indeed. No. 8 is one of his. It contains his name and titles "*Us Sultan ul A'zim Muizz-ud-Daulat Khusrau.*" The mark on the *jhúl* of the bull is found also on the coins of his son Khusrau Malik. No. 2 exemplifies this.

The coins of Khusrau Malik resolve themselves into four classes. Two are of the bull type. One of these bulls has another sign, peculiar to these coins, on the *jhúl* of the bull, with a cross for a *rump* mark. The other has the sign already mentioned which is probably some word in *tughra*. The rump mark is the same as that of the previous coin, while the coin of Khusrau Sháh has a *trident* or *lotus*.

A third class has on the obverse a dotted margin and on the reverse two stars, one above the other, below the inscription, as in No. 3.

The inscription on all these coins is the same "*Us Sultán ul A'zim Táj ud Daulat Khusrau Malik.*"

The fourth class is by far the most numerous. The obverse is in every case the same:—a dotted margin with inscription "*Us Sultán ul A'zim Suráj ud Daulat.*" The reverse is of four different kinds, though each contains the name "*Khusrau Malik*" in a circle. Above the name, in some kinds, is an *empty space* as in No. 4, in some a



Engraved at the Surveyor General's Office Calcutta.

COINS OF KHUSRAU SHAH & KHARRAN MALIK.



*crescent* as in No. 5, in some few *a star* as in No. 6, and in some a *cloud* or *canopy* as in No. 7. Nos. 4, 6 and 7 are very rare. No. 5 is common.

No. 9 is a new type of the coins of Tuglaq Sháh I.

No. 10 shows that he went on coining as his predecessors had done. The name of the king is on the obverse, on the reverse "*hazrat Dehli.*" No. 13 shows that Bahlol Lodí did the same. Both these types are very rare and are not in Thomas.

No. 11 was published\* by Mr. Delmerick in this Journal as "*a new type*" His specimen had no mintage on it. The present one shows that it was struck "*fi mulk i Talang*" in the year 724 A. H. I have seen several specimens of this coin. They are all deeply, but roughly cut. This is the only one I have seen with the place of mintage on it.

Nos. 14, 15, 16 are different types of the coins issued in the joint names of Fíroz Sháh and Muhammad Sháh,—the one name occupying one side "*Fíroz Sháh Sultáne,*" and the other side being occupied with "*Muhammad Sháh Sultáne.*" Thomas calls his coin "*unique.*" P. 307, No. 262.

No. 18 is a new type of a coin of the same kings. It is the same as some in Thomas, only about one half of the weight.

No. 17 is altogether a new type of coin of Fíroz Sháh. Obverse :— "*Fíroz Sultáne.*" Reverse :—" *Amir ul Mominín Abú ul Fath.*" This coin is in the cabinet of David Ross, Esq., Traffic Manager, Scinde Punjab and Delhi Railway.

No. 12 is an unpublished type of Bahlol Lodí :—Obverse, *Bahlol Sháh Sultán.* Reverse, *Shahr i Jaunpúr* 888.

The above new types of coins were all obtained in the Panjáb. Many of them are unpublished. I have not the slightest doubt that further search will give duplicates of many as yet unique coins.

\* J. A. S. B. Part I, Pl. IX, fig. 4.

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## LIBRARY,

The following additions have been made to the Library since the Meeting held in May last.

TRANSACTIONS, PERIODICALS AND JOURNALS.  
*presented by the respective Societies or Editors.*

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Batavia. Genootschap van Kunsten en Wetenschappen,—Notulen van de Algemeene en Bestuurs-Vergaderingen, Deel XII, No. 4; XIII, Nos. 1, 2, 3 and 4; XIV, No. 1; XV, Nos. 2, 3, and 4; XVI, Nos. 1, 2, 3 and 4.

———. ———. Tijdschrift voor indische Taal,-Land-en Volkenkunde, Deel XXI, Nos. 5 and 6; XXII, Nos. 4, 5 and 6; XXIII, Nos. 1 to 4; XXIV, Nos. 4, 5 and 6; XXV, Nos. 1 and 2.

———. ———. Verhandelingen,—Deel XXXVII, XXXVIII and XXXIX, Stuk 1.

Bombay. The Indian Antiquary,—Vol. VIII, Part 93, May 1879.

*McCrindle, J. W.*—The Periplus of the Erythræan Sea. *Fleet, J. F.*—A Particular Use of the word Samvat.

Bordeaux. La Société de Géographie Commerciale,—Bulletin, No. 9, May 1879.

*D'Estrey.*—Le golfe Persique et son Commerce.

Florence. Società Toscana di Scienze Naturali,—Atti, Marzo, 1879.

London. Athenæum,—Nos. 2686 to 2689.

———. Nature, Vol. XIX, Nos. 494 and 495, and Vol. XX, No. 496.

———. Society of Telegraph Engineers,—Journal, Vol. VII, No. 24, and Vol. VIII, No. 25.

No. 25. *Dubern, G.*—A New Form of Sounder.

Metz. Die Verein für Erdkunde,—Erster Jahresbericht, 1878.

Palermo. Società degli Spettroscopisti Italiani,—Memorie, Vol. VIII, Disp. 3, March 1879.

*Ricco, A.*—Combinazioni spettroscopiche a visione diretta. *Tacchini, P.*—Macchie Solari e facole osservate a Palermo nei mesi di Gennaio, Febbraio e Marzo 1879.

Roorkee. Professional Papers on Indian Engineering,—Vol. VIII, No. 3, April 1879.

*Cunningham, A.*—New Researches on the Expression of the Conditions of Motion of Water in Drains (Translation). *Dundas, J.*—Report on Experiments made at Lucknow on the Strength of Sal and Teak Timber, in 1877 and 1878.



St. Petersburg. La Société Impériale Russe de Géographie,—Séance mensuelle du 7 Mars 1879.

BOOKS AND PAMPHLETS,  
*presented by the Authors.*

- CLARKE, H. W. Note on Elephants. Calcutta, 1879, Pamphlet.  
 ———. Report on the Transporting of Elephants by Railway. Calcutta, 1879, Pamphlet.  
 DISTANT, W. L. Notes on some *Hemiptera Homoptera*. Pamphlet.  
 ———. Description of new Species of *Hemiptera Homoptera*. Pamphlet.  
 ———. The Inhabitants of Car Nicobar. Pamphlet.  
 ———. Our present knowledge of Nicobarians. Pamphlet.  
 ———. Eastern Coolie Labour. Pamphlet.  
 ———. On *Hemiptera* from the N. E. Frontier of India. Pamphlet.

MISCELLANEOUS PRESENTATIONS.

A. BROOME. History of the Rise and Progress of the Bengal Army, Vol. I, 8vo., Calcutta, 1850.

H. K. W. ARNOLD, Esq.

Tweede Vervolg—Catalogus der Bibliotheek, 8vo., Batavia, 1877.

Verslag der Viering van het Honderd-jarig Bestaan, 4to., Batavia, 1878.

STUART, A. B. Kawi Oorkonden. Inleiding en transcriptie. With Plates. 8vo., Leiden, 1875.

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No. 98. *Barker, G. F.*—Results of the Spectroscopic Observation of the Solar Eclipse of July 29th, 1878. *Ihlseng, M. C.*—Mode of Measuring the Velocity of Sound in Wood.

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No. 17. *Jamin, J.*—Sur la lumière électrique. *André, Ch.*—Sur un mode d'enregistrement continu de la direction du vent. *Cazenove, P.*—Sur le dosage du glucose dans le sang. *Le Président de la Commission du Passage de Vénus.*—Documents relatifs aux mesures des épreuves photographiques.

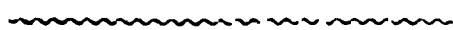
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No. 43. *Bréal, M.*—La science du langage.

No. 44. *Rimbaud, A.*—La Russie Orientale et l'Asie Russe.





**PROCEEDINGS**  
**OF THE**  
**ASIATIC SOCIETY OF BENGAL,**  
**FOR JULY, 1879,**

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The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd July, at 9-15 P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From V. Ball, Esq.—copies of his papers on Volcanoes of the Bay of Bengal, and On the forms and Geographical Distribution of Ancient Stone Implements in India.

2. From the Secretary of State for India—"The Voyages of Sir James Lancaster, to the East Indies and of Captain John Knight to seek the North West Passage;" and "The Hawkins' Voyage during the reigns of Henry VIII, Queen Elizabeth, and James I," published by the Hakluyt Society and edited by C. R. Markham.

3. From E. H. Man, Esq.—"The Commerce and Navigation of the Ancients in the Indian Ocean," by Dr. W. Vincent.

4. From the Department of Revenue, Agriculture and Commerce—"The Narratives of the Mission of George Bogle to Tibet, and of the Journey of Thomas Manning to Lhasa"; 2nd edition, by C. R. Markham.

5. From the Superintendent, Marine Surveys—A chart of Rajapur Bay and Viziadurg, West Coast of India.

6. From the Bengal Secretariat—"A Manual of Geology of India," by H. B. Medlicott and W. T. Blanford.

7. From Dr. Rájendralála Mitra, Rai Bahadur, C. I. E.—Facsimiles of the Ananta Vasudeva Temple Inscriptions.

8. From Babu Surjya Narain Singh of Bhagulpur—Three silver coins, (1) of Bahadur Shah, (2) of Sher Shah, (3) of Islam Shah, son of Sher Shah.

The following gentleman, duly proposed and seconded at the last meeting, was introduced for and elected an Ordinary Member—

**M. FINEANE, Esq., C. S.**

The following is a candidate for ballot at the next meeting—

**HARR W. JONES, Colleague,** proposed by **L. SCHWENKER, Esq.,** seconded by **MAJOR J. WATERHOUSE.**

The SECRETARY reported that the following coins had been acquired under the Treasure Trove Act from the Collector of Karnul—one gold Pagoda and one gold Maria found in the old ruined village site of Pallagumme, District Karnul.

The SECRETARY read an extract of a letter from Mr. Grote, dated 5th June, regarding the publication of the first part of Mr. Moore's papers on New Indian Lepidoptera from the collection of the late Mr. C. S. Askinson, stating that it was hoped that the work would be read for publication in about a fortnight.

MAJOR WATERHOUSE exhibited a copy of a new—the 4th—edition of the Map of Turkestan, presented to the Society, by Major-General J. T. Walker, C. B., R. E., F. R. S., Surveyor General of India—under whose orders it has been compiled—and read the following note upon it.

*On the Fourth Edition of General Walker's Map of Turkestan, in four Sheets.*

In this edition the map has been extended by one degree in latitude, both to the north and south, beyond the limits embraced in the previous edition; extension was necessary to the south, in order to include the stations of Sukkur and Jacobabad, in Upper Sind, which formed the base of the recent military operations in Southern Afghanistan; and a corresponding extension was made to the north, to preserve the symmetry of the map.

Sheets 1, 2 and 3 have been entirely re-drawn. Sheet 4 embraces an area for which extensive geographical additions and rectifications may be expected in the course of a year or two; besides which it contains a large amount of intricate hill-shading of the Himalayas which could not well have been re-drawn by the available agency, soon enough to permit of the publication of the map at as early a date as was desirable; it has therefore been corrected up to date, and not re-drawn, and this circumstance will readily account for its being in some parts less highly finished than the other sheets, to any person who is familiar with the process of

photo-zincography, by which the map has been re-produced for speedy publication.

The new matter contained in the present as compared with the previous edition, and the various sources from which it has been derived, are as follow :—

Sheets 1 and 2 have not only been extended northwards from the 47th to the 48th parallel, but contain extensive additions, on the borders of the Caspian and Aral Seas, in Khiva and Bokhara and the Turkoman Desert and along the course of the River Oxus, and more particularly in Khokand and Hissar, the Alai Plateau, the Northern Pamir, and the independent States of Karategin and Darwaz. These have been mostly derived from the Russian Map of the Turkestan Military Circle, in 12 sheets—published first at Turkestan in 1877, and afterwards with corrections, as a chromo-lithograph, at St. Petersburg in 1878—and other Russian maps of which early copies were obligingly forwarded to General Walker by General Stubendorf, the Director of the Topographical Branch of the Russian War Office ; something also has been obtained from Russian maps published in the '*Geographical Magazine*' and from the maps accompanying Mr. Schuyler's '*Turkestan*' and Captain Burnaby's '*Ride to Khiva*.'

It happens by a singular coincidence that, in the primary compilation of Sheet 2, the same error was made in accepting various details given in the Russian Map of the Upper Oxus Region (1878) which were afterwards proved to be erroneous, as was made in the compilation of the map *Das Quellgebiet des Oxus*, in Part I of Dr. Petermann's *Mittheilungen* for 1879. At the time when the drawing of this sheet was commenced, both the first edition of the Turkestan Map and the Map of the Upper Oxus Region were available ; the latter, being on a larger scale and much superior in finish and execution, and also being the later of the two, was accepted as accurate, pending a reference to General Stubendorf on the subject. His reply to General Walker was almost identical with his reply to the editors of the *Mittheilungen* which is quoted at length in that Journal ; happily it was received in time to permit of the erroneous matter being expunged and replaced by correct matter before the map was sent to press, which had not been practicable in the case of the German map.

In rendering the portions of Karategin and Darwaz which are most closely adjacent to the remarkable bend in the Panja branch of the River Oxus, the work of one of the Trans-Himalayan explorers—the Havildar—has been more closely followed than by the compilers of the Russian maps ; for, though the Havildar was not a finished surveyor, he certainly

went over the ground near the river, taking bearings and pacing distances, whereas the Russian surveyors had not then extended their operations anything like so far to the south.

Of Sheet 3 the greater portion has been re-drawn on the basis of Major St. John's Map of Persia, with additions and corrections up to date, which were obligingly furnished by Major St. John. Major Wilson's Map of Afghanistan has been borrowed from to a large extent; and the conclusion at which he arrived, on an examination of certain documents which were lodged in the India Office—after the first Afghanistan War—that the longitude of Kandahar is probably some 10 to 15 miles to the east of the position hitherto assigned to it on most maps, has been accepted. Recent surveys have shown that Major Wilson is probably correct; and moreover it is known that the longitude hitherto adopted was a provisional value, chosen arbitrarily, with the intention that it should be rectified, after the reduction of Lieut. Durand's astronomical observations in 1843 for the determination of the longitude; but apparently through some oversight Lieutenant Durand's value was not employed, and the provisional value has been adopted up to the present time.

Colonel MacGregor's Reconnaissance across the Desert of Beluchistan; and Major Napier's Sketch of the northern Frontier of Khorassan, have been used in the compilation of Sheet 3. The recent operations of the Survey officers attached to General Stewart's Division of the Army in Afghanistan, have been available to some extent, for the purpose of adding to, and correcting the details of the routes between Khelat, Quetta and Kandahar; but the information derived from this source has as yet been very little, the greater portion of the maps not having reached the Surveyor General's Office.

Sheet 4 contains much new geography which has been obtained from other Survey officers with the armies in Afghanistan. An area of nearly 8,000 miles has been reconnoitered on the south-east frontier by Captains Heaviside and Holdich, while accompanying the column marching with General Biddulph from Kandahar to Dera Ghazi Khan, by the Tal-Chotiali route. A considerable area has also been surveyed in the valleys of Kurram, Khost, and Alikheyl, and generally in the country to the south of the Safed Koh Range, by Captain Woodthorpe, in connection with the movements of the column under General Roberts. And extensive additions to our knowledge of the country to the north of the Safed Koh Range, and for some distance beyond the Kabul River, have been made by Major Tanner, Captains Strahan and Leach, and Mr. G. Scott. Alterations in the delineation of the basins of the northern affluents of the Kabul River, which take their rise in the western portion of the Hindu







Fig. 1041

Fig. 1042

SCULPTURED GROUP FROM KALIDASA

Scale—One-fourth full size

Kush Range, have been made on the authority of Major Wilson's Map of Afghanistan. In the region between the Kunar-Chitral River and the Indus considerable rectifications have been made, on the evidence of recent route Surveys by one of the Trans-Himalayan explorers—the Mullah—who has traced the Swat and the Punjkora rivers and several affluents of the Indus, to their sources in the Kohistan. The position of Tirich Mir, the highest peak yet discovered on the Hindu Kush Range, lying immediately to the north of Chitral, has been laid down from observations by Major Biddulph, who inclines, however, to the opinion that the mountain is some three or four thousand feet higher than the provisional value, 23,400, entered on the map as derived from his observations. The rendering of Kunjut and Shimshal, and the tract of country to the north of the Western arm of the Karakoram and Mustagh Range, has been greatly altered, so as to show more clearly what a large extent of *terra incognita* still remains to tempt any enterprising explorer—be he Russian or Englishman—to visit those regions. And far away to the east, between the valleys of Gangutri and Milam and along the border line between British India and Chinese Thibet, various not unimportant rectifications have been made on the basis of recent Surveys by Messrs. Ryall and Kinney.

Sheet 4 is now being re-drawn with a view to the publication of a new (the fifth) edition of the map, as soon as further data are available, which will probably be at no very distant date.

The present edition of the map has been wholly drawn, and also photo-zincographed, at the Head Quarters Office of the Trigonometrical Branch of the Survey Department in Dehra Dun, as were all the preceding editions.

The following papers were read :—

1. *Description of some Stone Carvings, collected in a tour through the Doab, from Cawnpore to Mainpuri.*—By H. RIVETT-CARNAC, C. S., C. I. E.

(With Plate V.)

The carvings and fragments of carvings submitted to the Society are a portion of those collected by me, during a tour through the Doab from Cawnpore to Mainpuri, through the well known tract, marked by the ruins of Kanouj, Sankesar, &c. The carvings are sent to demonstrate the importance of even fragments of ancient carvings being collected and preserved in the hope of obtaining therefrom some information regarding the habits, the circumstances and the state of civilisation of the people, by whom they were fashioned.

(I.) The red sandstone block is a fragment, and unfortunately a small fragment only, of what must have been a remarkably well-executed figure

of a woman. The proportions are good, and it will be noticed that the drapery has been most carefully and elaborately sculptured, the effect of the fineness and transparency of the texture of the cloth having been successfully rendered. The hand has been delicately chiselled and the whole work has been finished *ad unguem*. The jewelled belt round the waist must have been laboriously copied in every detail, with its beads and settings and chains and bosses, from some handsome original. This fragment would appear to belong to the period of Hindu luxury and power, immediately preceding the Muhammadan invasion. The fragment, even in its very imperfect state, conveys some idea of the beautiful clothes and the jewellery with which the women of that time were bedecked, and proves that the Hindu sculptor seven or eight hundred years ago was a proficient in his art. This fragment came out of a *khera* or mound at Kanouj from which bricks and stone were being collected and broken up for railway ballast. The figure had obviously been smashed by Muhammadan iconoclasts. Still what remains, I am confident, the Society will consider worthy of being preserved, fragment though it is.

(II.) The second piece (Plate V) is, I think, still more remarkable. This too is unfortunately only a fragment, the Muhammadan iconoclasts having effectually demolished the greater part of it. From what remains, however, it is to be gathered that the carving, when complete, represented a figure on horseback, accompanied by two attendants. The boldness of the group and the depth of the carving are, I think, remarkable; the figures stand well out in relief, and it will be noticed that even the portions of the dress &c. in the background are carefully finished. The saddle and accoutrements are elaborately rendered in every detail. There are, it will be seen, three saddle-cloths, the one arranged above the other, partly for ornamentation and partly to protect the horse's back. The knot securing the saddle has been tied and adjusted with professional precision. The body of the horse represents an animal, in rather too good condition, perhaps, according to our ideas, but with the rounded lines which even the native potentate of the present day is glad to secure for his steed of state. The action of the horse is spirited. The rendering of the two attendants is, I think, particularly meritorious. The proportions of the figures are excellent. They too are finished *ad unguem*. Unfortunately both of the heads have been smashed off. But enough remains of the leading figure to trace the turn of the head and the arrangement of the hair,

*"in comptum Lacænae*

*More comas religata nodum"*.

The whole group seems to bear traces of Greek influence, and is certainly of a type quite different from the Hindu carvings of the present day.

The group was obtained by me from a little shrine near the village of Makranaggar close to a *khera* in which the sub-contractors had been digging for railway ballast, and this group, we were told, had been dug out of the *khera* during the operations.

(III.) The foliage and mango fruit of the fragment of what would appear to have been a portion of a large-sized carving, is rendered with more truthfulness and care than is generally met with on native sculptures of the present day.

It was found under a tree close to Gudanpur, where ballast operations under a native contractor had been in full swing for six weeks, in digging up and breaking up for ballast a *khera* which is supposed to represent the ruins of a palace of the Raja Bhoj, a favourite character in the traditions of this part of the country. Several miles of sandstone ballast have been supplied by this ruin alone. When I first visited the spot, about a month ago, large quantities of sandstone rubble were being dug out of the ruins; this was well adapted for ballast, and there was no sort of objection to the material being so utilised. But I saw carvings and the remains of carvings *in situ*. It is true that those I saw were of no value. But I found a coolie in the act of breaking up a small carved figure. It was hardly worth preserving, perhaps, but a coolie who smashed up an indifferently carved figure would hardly discriminate in the case of a valuable work of art. Unfortunately no attempt had been made, so far as I could ascertain, to make any plan of the ruin which was being demolished. I was told on the spot that an interior tank, surrounded by a number of small chambers had been come upon in the course of excavation. The whole place was in the process of being dug out, and there will soon not be a stone left. Some pieces of carving had been rescued by the villagers and placed under trees, or on platforms close by, and some of these were obtained by me and made over to the Collector for the proposed Museum. The piece of green stone, which I believe to be jade, was found here.

(IV.) The large head sent herewith was obtained at Behar, near Sankesar. From its proportions it must have belonged to a colossal figure. The type of face is hardly Hindu and approaches in character to the carvings found in the Punjab, which are held to bear distinct traces of Greek influence. Perhaps the figure to which the head belongs might be found, if Behar was systematically examined.

The mounds at Behar would, I am sure, repay excavation.

(V.) The little group of a man, woman and child standing under a tree, was obtained by me at Sankesar, where it was placed with other carvings and fragments of carvings near one of the chief shrines. The man's figure is particularly well sculptured. The woman, with her ornament &c., is

rendered somewhat in detail. The grouping, the proportions and the execution of these figures is, I think the Society will agree, very superior to the Hindu art of the present day. But for the presence of the child the group might be taken to represent Adam and Eve in the garden.

I believe that if fragments such as these now sent, were to be carefully collected in all Districts, some information might be obtained of the customs and the circumstances of former dynasties. The different styles of arranging the hair to which Dr. Rájendralála Mitra, C. I. E., first drew attention in his valuable work on Orissa, is in itself alone a study among the fragments I have seen in Fatehgarh.

2. *Note on an Inscription from the Gate of the Krishna Dwáráká Temple at Gáya.*—By DR. RÁJENDRALÁLA MITRA, RAI BAHÁDUR, C. I. E.

(Abstract.)

This inscription was first seen by Dr. Mitra in 1864. General Cunningham also noticed it in 1872 and published a facsimile of it in the *Archæological Survey Reports* (Vol. III, plate XXXVII.) It consists of 18 long lines in the Kutila characters; and measures 30 × 13 inches. It is in no way connected with Buddhism, nor with the temple to which it is now attached. It distinctly names Vishnu as the divinity for whom the temple which bore it was built. The dedicator of the temple is said to be Soma, a petty Zamindar, a descendant of one Viṣvāditya. The latter is said to have encouraged the study of Sahadeva's treatise on the veterinary art. Sahadeva was a twin brother of Nakula, who is known to have written a work on the diseases of horses; and it is very likely that this work also passed in the name of his twin brother. The inscription bears date, the 15th year of Rája Naya Pála Deva. His reign began about the year 1040 (see Dr. Mitra's paper on the Pála Rájas in the *J. A. S. B.*, 1878). His fifteenth year, accordingly, would fall about the middle of the sixth decade of the 11th century.

This paper will be published in *Journal*, Part I.

3. *The Sect of the Prán-náthis.*—By F. S. GROWSE, Esq., B. C. S.,  
M. A. OXON., C. I. E.

(Abstract.)

The small and obscure sect of the Pránnáthis is one of the few of whose literature Prof. Wilson, in his *Essays on the Religions of the Hindus*, was unable to furnish a specimen. This want is now supplied by Mr. Growse's publication of the text and English translation of one of the poems of Pránnáth himself. It is entitled *Kiyámat-náma*, and is

the last and shortest of the fourteen treatises, ascribed to Pránnáth. It is very curious, both from the advanced liberalism of its theological ideas, and also from the uncouthness of the language, in which the construction of the sentences is purely Hindi, while the vocabulary is mainly supplied from Persian and Arabic sources. The writer, a Kshatriya by caste, lived at the beginning of the 18th century and was under the special patronage of Chhattrasal, the famous Rájá of Panna in Bandelkhand, who is commonly said by the Muhammadans to have been converted to Islám, though in reality he only went as far as Pránnáth, who endeavoured to make a compromise between the two religions.

This paper will be published in the Journal, Part I.

4. *The Copper Coins of the old Maharájas of Kashmír.*—By CHAS. J. ROGERS, Esq., *Principal, Normal College, C. V. E. S., Amritsar.*

(Abstract.)

This paper gives a description of 26 coins, some of which have not before been published. Most of them belong to 19, out of the list of 38 kings given in Prinsep's Tables, beginning with Avanti Verma, A. D. 875, down to Jaga Deva A. D. 1153. Two of the coins, here described, belong to kings hitherto unknown, Java Deva Deva and Bopya Deva. A third coin has not yet been identified. Nothing like a sign approaching to a date has as yet been traced on any coin.

This paper will be published, with two plates, in the Journal, Part I.

5. *Copper Coins of the Sultans of Kashmír.*—By CHAS. J. ROGERS, Esq., *Principal, Normal College, C. V. E. S., Amritsar.*

(Abstract.)

This paper contains the description of 12 coins, among which are several that have not before been published. They belong to ten of the Sultans, mentioned in Prinsep's Tables; beginning with Sikandar Shah A. D. 1396, down to Júsaf Shah A. D. 1578. Most of them have dates, more or less distinctly legible.

This paper will be published, with one plate, in the Journal, Part I.

## LIBRARY,

The following additions have been made to the Library since the Meeting held in June last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,  
presented by the respective Societies or Editors.

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Berlin. Die Königliche Preussische Akademie der Wissenschaften,—Monatsbericht, January and February, 1879.

February. *Vogel*.—Ueber die photographische Aufnahme von Spectren der in Geisslerröhren eingeschlossenen Gase. *Schrader*.—Ueber die Datirung einer babylonischen Thontafel aus dem elften Jahre des Cambyses.

Bombay. The Indian Antiquary,—Vol. VIII, Part 94, June 1879.

*Watson, Major J. W.*—The Fall of Pâtan Somanâth. *Walhouse, M. J.*—Archæological Notes, Nos. 22 and 23. *Foulkes, Rev. T.*—Grant of the Pallava king Nandi Varmâ.

Bordeaux. La Société de Géographie Commerciale,—Bulletin, No. 10.

*D'Estrey*.—Le Golfe Persique et son Commerce.

Calcutta. The Geological Survey of India,—Memoirs, Palæontologia Indica, Series XIII. Salt Range Fossils.

*Waagen, W.*—Productus—Limestone Fossils. *Pisces Cephalopoda*.

———. Mahâbhârata,—Part 35.

———. Râmâyana,—Parts 8, 9 and 10.

Hamburg. Die Verein für naturwissenschaftliche Unterhaltung,—Verhandlungen, Band III.

London. Athenæum,—Nos. 2690 to 2693.

———. Nature,—Vol. XX, Nos. 498 to 501.

Palermo. Società degli Spettroscopisti Italiani,—Memorie, Vol. VIII, Disp. 4, April 1879.

*Tacchini, P.*—Osservazione solari dirette e spettroscopiche fatte a Palermo nel 1° trimestre del 1879.

Paris. Revue de Linguistique,—Vol. XII, Fasc. 1 and 2, January and February, 1879.

Fasc. 2. *Piétremont, C. A.*—Les Aryas et leur première patrie.

———. La Société de Géographie,—Bulletin, Vol. VII, Part 20.

Le chemin de fer de l'Asie Centrale. Nouvelle exploration projetée par S. A. I. le grand duc Nicolas Constantinovitch.

Rome. Reale Accademia dei Lincei,—Atti, Vol. III, Fasc. 5, April 1879.

*Herzen*.—Dell' influenza dell' acido borico sulla fermentazione acetica.



St. Petersburg. La Société Impériale Russe de Géographie,—Séance plénière mensuelle du 11 Avril, 1879.

Turin. Reale Accademia delle Scienze,—Atti, Vol. XIV, Disp. 3, February, 1879.

## BOOKS AND PAMPHLETS,

*presented by the Authors.*

BALL, V. Volcanoes of the Bay of Bengal. Pamphlet, 1879.

———. On the Forms and Geographical Distribution of Ancient Stone Implements in India. Pamphlet, 1879.

## MISCELLANEOUS PRESENTATIONS.

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No. 21. *Fremy.*—Recherches chimiques sur la formation de la houille. *Tresca.*—Sur la distribution du travail à distance au moyen de l'électricité.

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No. 46. *Faye.*—Les lois des tempêtes. *Rimbaud, A.*—La Russie orientale et l'Asie russe.

No. 47. *Rialle, G. de.*—Les Aryas primitifs.

No. 48. *Jouan, H.*—Distribution géographique des oiseaux en Océanie.

No. 49. *Joly, N.*—L'homme préhistorique Américain. (1) Les Chulpas du Pérou et de la Bolivie. (2) Les Mounds et les Munds-Builders.

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Tarikh-i-Tahmasp. 8vo.

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PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL,  
FOR AUGUST, 1879.

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The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 6th August, at 9.15 P. M.

W. T. BLANFORD, Esq., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed :—

The following presentations were announced—

1. From St. Xavier's College Observatory,—Statement of Results from July to December, 1878.

2. From the Superintendent, Marine Survey,—(1) Chart of Preparis North Channel and entrance to Bassein Roads ; and (2) Chart of Verawal Roads, Kattywar, West Coast of India.

3. From Major-General J. T. Walker, R. E., C. B.,—two copies of the 4th edition of the Map of Turkestan.

4. From the Author,—the *Sanghita*, by Harasundar Tarkaratna.

5. From the Trustees of the British Museum,—(1) Index to the collection of Minerals, by Nevil Story-Maskelyne ; and (2) Catalogue of the Birds in the British Museum, Vol. IV,—*Passeriformes*, or Perching Birds, *Cichlomorphæ*, Part I, by R. B. Sharpe.

6. From the K. Institut voor de Taal-Land-en Volkenkunde von Nederl. Indie :

(1) *Abiasa een Javaansch Tooneelstuk*, by H. C. Humme.

(2) *Javaansche Vertellingen*, by Dr. W. P. van den Broek.

(3) *Babad Tanath Djawi*, in proza, by J. J. Meinsma.

7. From H. K. W. Arnold, Esq.,—a Brief Account of some of the principal Buildings of Madura, compiled by E. J. Sewell.

8. From the Registrar, Calcutta University,—Tagore Law Lectures, 1878. *The Hindu Law of Marriage and Stridhan*, by Gooroodass Banerjee.

9. From the Chief Commissioner of Mysore,—Mysore Inscriptions. Translated by Lewis Rice.

10. From the Department of Home Revenue and Agriculture,—(1) a Pahlavi, Gujarati and English Dictionary, by J. D. M. J. Asana. (2) Anatomical and Zoological Researches, comprising an account of the Zoological Results of the two Expeditions to Western Yunnan in 1868 and 1875, by Dr. J. Anderson.

11. From the Russian Geographical Society,—Adventures of the Priest Radivil Sirotki in the Holy Land, by P. A. Giltebrandt.

The following gentleman, duly proposed and seconded at the last meeting, was balloted for and elected an Ordinary Member—

Herr W. Joest.

The following are candidates for ballot at the next meeting—

1. D. G. Barkley, Esq., M. A., B. C. S., proposed by Carr-Stephen, Esq., seconded by Major J. Waterhouse.

2. R. Maconochie, Esq., C. S., Settlement Officer, Delhi, proposed by D. Ibbetson, Esq., C. S., seconded by J. Wilson, Esq.

3. Dr. C. F. Oldham, F. R. G. S., Surgeon-Major, 1st Goorkhas, Dharamsala, proposed by Lieut. R. C. Temple, seconded by Major J. Waterhouse.

4. W. D. Blyth, Esq., C. S., proposed by H. Beverley, Esq., seconded by W. T. Blanford, Esq.

The SECRETARY announced that Lieut.-Col. E. G. Clark had intimated his desire to withdraw from the Society.

The PRESIDENT announced that in accordance with the notice given at the June meeting, the votes would be taken on the proposed amendment to Rule 14 e.

Messrs. Westland and Wood-Mason were appointed Scrutineers and reported that the votes were 88 for, and 2 against the amendment.

The PRESIDENT announced that the amendment was carried.

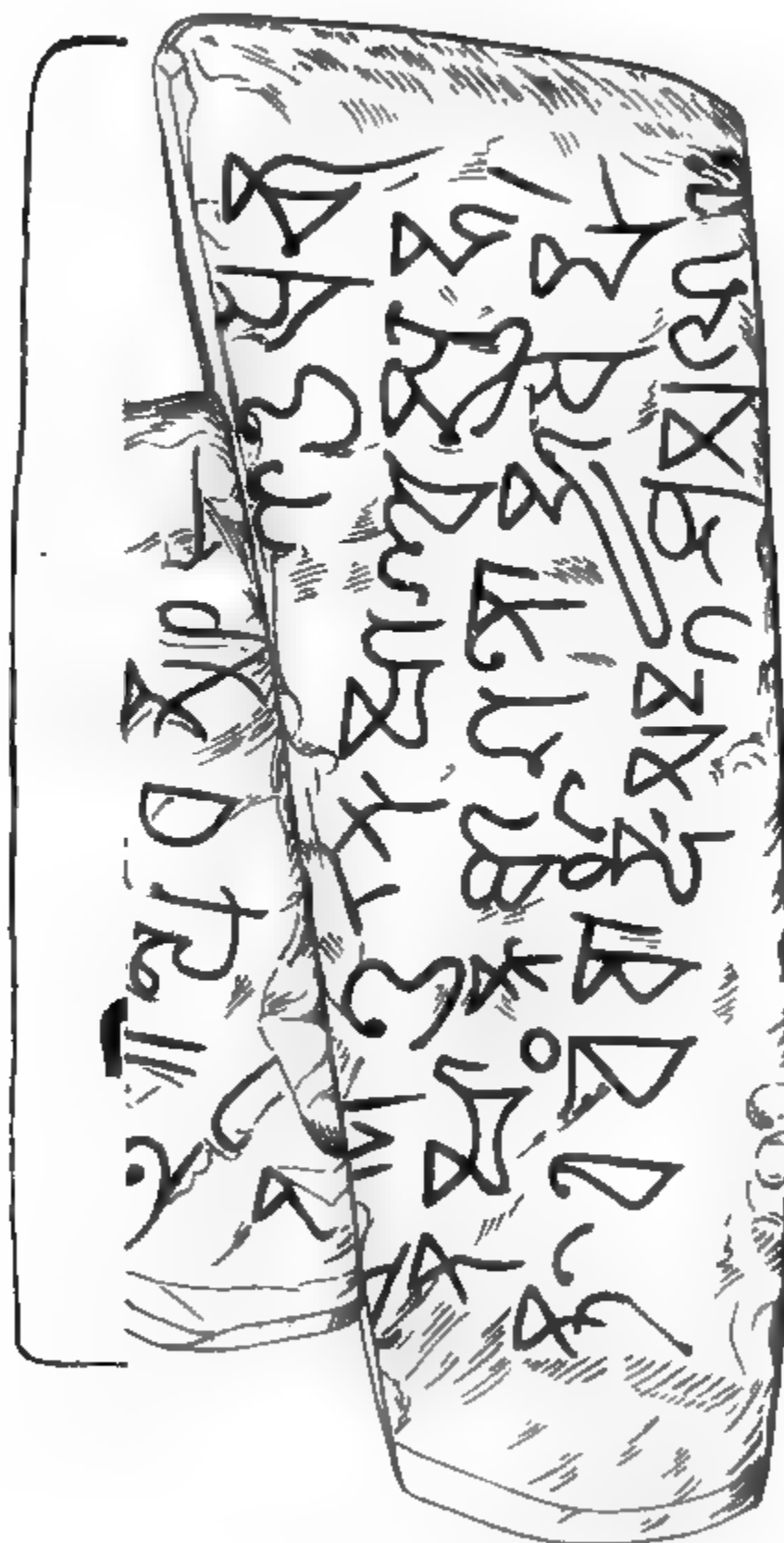
The SECRETARY reported that the following coins had been acquired under the Treasure Trove Act—

From the Collector of Bijnor,—Two Silver Coins of Mahmud Sháh.

From the Magistrate of Budaun—Five Silver Coins of the “Hindu-Muhammadan” type.

The SECRETARY read a letter from Mr. H. Rivett-Carnac asking for information from members of the Society on the following ethnological queries put to him by Prof. Schaffhausen of Bonn.

B



ly that its character is of the 8th century. It may be two or three centuries later, but certainly not older. The first three lines of B are exact counterparts of A, letter for letter, but the character is much older, probably of the 5th century. It is a corrupted form of the Gupta type. I cannot read the lower three lines just now.' "

Mr. W. T. BLANFORD exhibited a specimen of Hippuritic limestone collected by Dr. Oldham of the 1st Ghurka Regiment on the route from Kándahár to the Punjab by the Tal-Chotiali route. The specimen was obtained at a place called Siahgai, evidently the Mt. Siajgai of Lieut. Temple's map, about 70 miles E. N. E. of Quetta. The specimen exhibited shews casts of the interior of two *Hippurites* and portions of the shell of others.

The interest attaching to the discovery is considerable. *Hippurites* are characteristic of the cretaceous epoch, and especially of the period of the lower chalk (Turonian) and the Hippuritic limestone, so called on account of the prevalence of this very remarkable bivalve, is largely developed in Southern Europe and South-western Asia. This rock covers a large area in Persia and is found for some distance east of Karmán. A very small outcrop, probably referable to this formation, has been found in Sind and traces appear to occur in Tibet, north of the Himalayas. The discovery of the same rock in South-eastern Afghanistan serves somewhat to connect these isolated outliers. The rock from Siahgai is very similar to some of the Hippuritic limestone found in Persia.

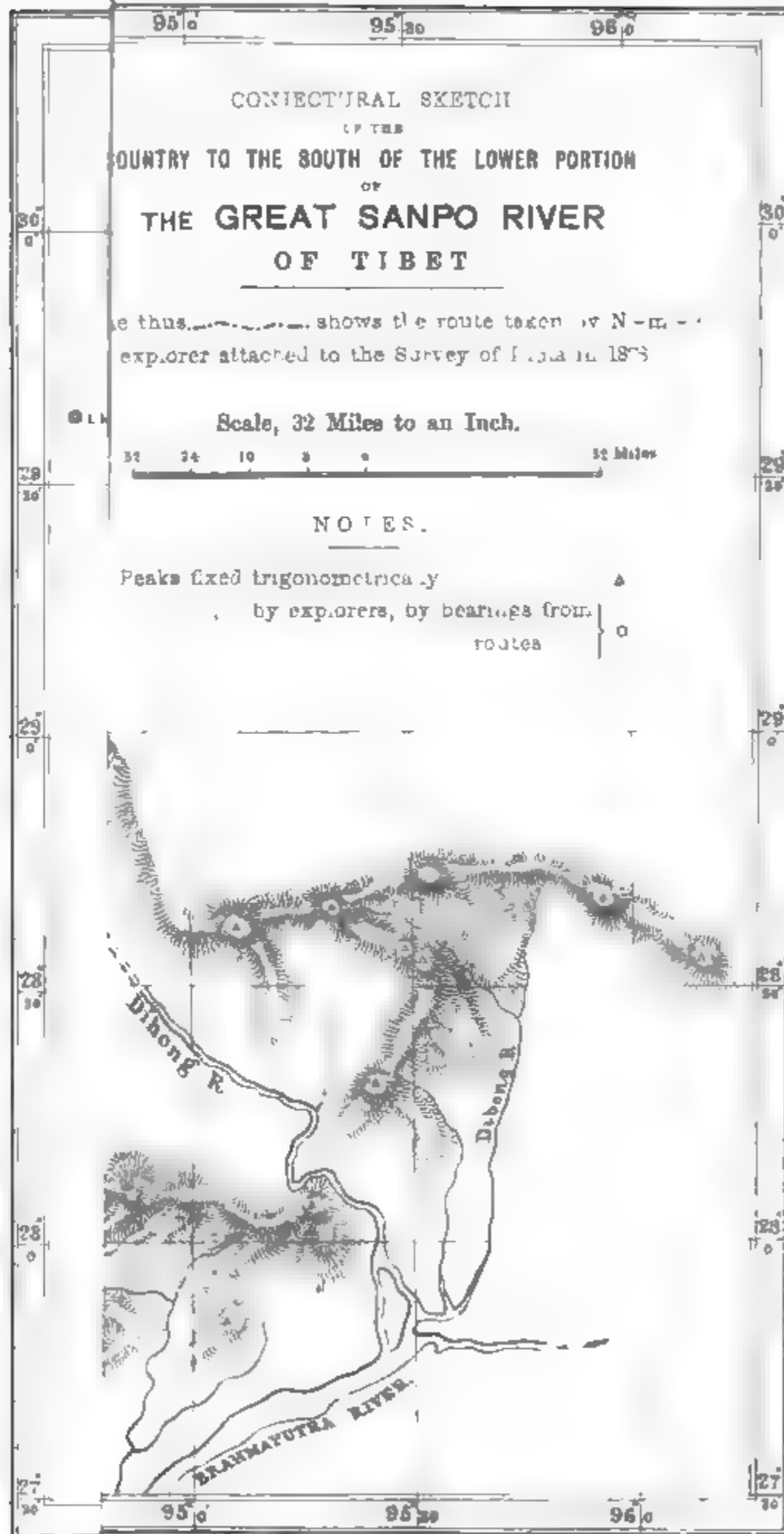
The following papers were read :—

1. *The Ravages of Rats and Mice in the Dakhan during the Harvest of 1878-79.*—By the REV. S. B. FAIRBANK.

(Abstract.)

In this paper the author gives an account of the ravages committed by rats at the end of 1878 in the Parner, Shrigonde and Karzat táluqs and part of the Nagar táluq in the Ahmednaggar collectorate, and also in some táluqs in the Poona, Sholapur and Kaládgi collectorates and adjoining native states. These ravages were attributed by the people to the Jerboa rat (*Gerbillus Indicus* or *G. longipes*), called by the natives *pándhará undir* or the *white* rat. It was new to the author to hear of this rat being a serious nuisance, as such ravages have generally been committed by the Metad rats, but there is no doubt that the *Gerbilles* have been the most numerous and so most destructive. They thrive just as well during the







rains as in the other parts of the year, and are not killed in their burrows by the rain as are the Metad and Kok rats.

The black-winged Kite (*Elanus cærulens*) feeds on the rats and is now, for the first time in the author's experience of 33 years, abundant in that part of the Dakhan.

The paper will be published in the Journal, Part II.

The SECRETARY read the following letter from Bábu Prannáth Pandit relative to the above paper :

“I am sorry that indisposition prevents me from attending to-night, but in connection with the Rev. Mr. Fairbank's paper, it might be of some interest to the meeting to know that the plague of rats was not unknown in Ancient India.

“*Kamandaki* in his *Nítisára*, a work composed anterior to the fourth century before the Christian era, has the following *s'loka* :

अतिदृष्टिरनादृष्टिर्मुषिकाः बलभाः शुकाः ।

प्रत्यासन्नाश्च राजानः पृथेते ईतयः सृताः ॥

“Excessive rain, drought, Rats, locusts, parrots, and neighbouring Kings (as invaders), these six are styled ‘*Itis*’ (calamities).”

“I have not the work of *Kamandaki* just now at hand, and am therefore unable to give the exact reference, but the *s'loka* in question is quoted by *Mallinátha* in his commentary on *Raghuvamsa* I, 63.”

2. *Exploration of the Great Sanpo River of Tibet during 1877, in connection with the operations of the Survey of India.—By Major-Genl. J. T. WALKER, C. B., R. E., F. R. S.*

(With map. Plate VIII.)

The course of this river has been explored by a new explorer N-m-g, for a distance of about 200 miles below the town of Chetang, the lowest point previously fixed. N-m-g was employed under the immediate instructions of Lieut. Harman, R. E., who has been writing out his journals and reducing and mapping his observations ; but Lieut. Harman has had his time so fully engrossed by his regular duties in connection with surveys which he is carrying on in and around Darjeeling, that he has been unable as yet to send in the full report of the explorations. The following is therefore to be regarded merely as a provisional account of them.

N-m-g was deputed to Chetang, the position of which had been determined by Pandit Nain Sing in 1875. His instructions were to explore the course of the Sanpo river downwards for as great a distance as he possibly

could. Crossing to the north bank of the river he went along it eastwards for a distance of about 30 miles, nearly down to the point where it is joined from the north-east by a small river, called the Mikchu; here he had to leave the river, and make a considerable detour, up the Mikchu valley, and over the Lungla pass on the range which forms the eastern boundary of the Lhása basin, then down the valley in which the Chokorgye monastery is situated half way up and that of Thakpo at its lower end, near the town of Gyatsa-Jong on the Sanpo river; here he again struck the river which had been wending its way through the mountains for a distance of about 20 miles while he had been making a detour of over 50 miles. From Gyatsa-Jong onwards he kept to the river, until he reached Gyala Sindong, beyond which point he could not advance.

About 30 miles below Gyatsa-Jong he crossed over to the right branch of the river near Thakpo Nongjong; this place is situated near the junction of a river from the south which is said to pass by the town of Tsari, which Lieut. Harman believes is identical with D'Anville's Chaii.

Up to Gyatsa-Jong the course of the Sanpo river is fairly in accordance with the course shewn on Pandit Nain Sing's map of the country which he traversed between Lhasa and Assam, viâ Táwáng; Nain Sing had seen the course of the river for a distance of about 30 miles below Chetang, and he had been informed that from that point onward it flows in a southeasterly direction into Assam. We now find that it does flow in a southeasterly direction, but only for a short distance beyond Gyatsa-Jong, after which its course is due east for some 50 miles and then north-east for about 80 miles. The river reaches its most northern point near the intersection of the meridian of  $94^{\circ}$  with the parallel of  $30^{\circ}$ , about 12 miles to the north-east of a place which the explorer calls Chámkar, and which Lieut. Harman identifies with D'Anville's Tchamca.

After attaining its most northern point the river turns due south-east, reaching Gya-la-Sindong in 15 miles, beyond which place N-m-g was not able to follow it. There, however, he saw that it flowed on for a great distance, passing through a considerable opening in the mountain ranges to the west of a high peak called Jungla, of which the bearing was  $130^{\circ}$ . Beyond this opening the river was said to pass through a country inhabited by savages into a land ruled by the British Government.

Assuming the position of Gya-la-Sindong to have been fairly well determined by the explorer, its direct distance from the highest point hitherto fixed on the Dihang river, in the course of the survey operations in Assam, is only about 100 miles. The height of Gya-la-Sindong was found by the explorer to be 8000 feet, showing that the river had fallen about 3500 feet in 200 miles of distance from Chetang and leaving a de-

scent of 7000 feet for the distance of 160 miles down to the junction of the Dihang river with the Brahmaputra ; this does not give an excessive slope compared with other Himalayan rivers.

One of the most interesting results of the present exploration is, that it affords an explanation of the probable source from which the Subansiri river draws its large volume of water. The fact of its volume being so large, coupled with the erroneous information derived from Nain Sing as to the supposed south-easterly course of the Sanpo below Chetang, had given rise to a conjecture that the Subansiri was the recipient of the Sanpo. That this conjecture is also erroneous has been shown by Lieut. Harman's recent operations for measuring the discharges of the principal affluents of the Brahmaputra river, which are briefly described at pages 16 and 17 of the *General Report of the Operations of the Survey of India* for 1877-78, and more fully in the *Journal of the Asiatic Society of Bengal*, Vol. XLVIII, Part II, No. 1, 1879. These operations indicate that the volume of the Dihang is from twice to three times as great as that of the Subansiri, so that of the two the Dihang has a far better claim to be the recipient stream. Still the difficulty remained of accounting for the large discharge of the Subansiri from so small a drainage area, and this difficulty is now removed, by the discovery of a large area below the great bend in the Sanpo around what may well be one of the two principal basins of the Subansiri and its affluents.

3. *Notes on Stone Implements.*—By J. COCKBURN, late Curator of the Allahabad Museum, Offg. Assistant Osteologist, Indian Museum, Calcutta.

(Abstract.)

In this paper the author describes some forms of celts and other stone implements found in the Khasi Hills, and in the Banda and Vellore districts.

The paper will be published in the Journal, Part II.

4. *Notes on the Gold Coins found in the Ahin Posh Tope.*—By MAJOR-GENERAL A. CUNNINGHAM, B. E., C. S. I.

(With plates IX, X, XI.)

When Dr. Hoernle wrote his notice of the gold coins found in the Ahin-posh Stúpa at Jalálábád, he was not aware that the inscription on the coins of *Wema Kadphises* had been discussed so long ago as 1863 by Professor Dowson and myself, quite independently of each other.\* Had he read our papers, he would have seen that several of his emendations of

\* For Professor Dowson's paper, see Royal Asiatic Society, Journal, XX, p. 239, and for my paper, see Bengal Asiatic Society, Journal, XXXII, p. 149.

Wilson's readings had been forestalled sixteen years ago, and that his proposed reading of *Sagdaloga-iswara*, or "sovereign of the Sogdians," is quite untenable. In our readings Mr. Dowson and myself agree in all the titles, and more especially in that of *Sarvalokiswara*; and I pointed out that the compound letter, which Dr. Hoernle now reads as *gd* was to be found in such words as *púrva* and *achárya* as well as in *Sarva*; and that a similar compound, *rt* is found in the name of *Artamisiyasa*. My reading of the inscription on the coins of Wema Kadphises, was as follows:

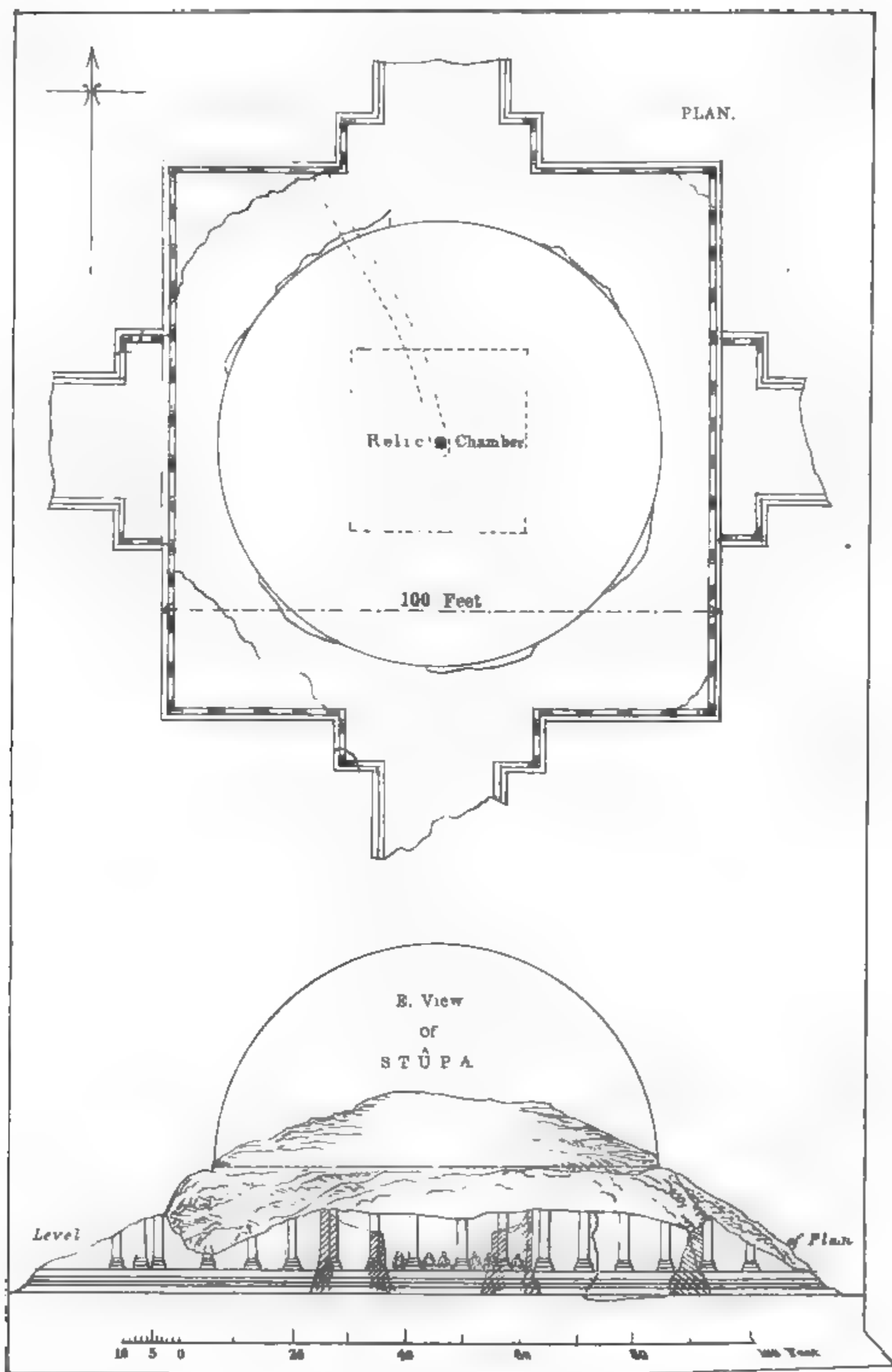
*Mahárájasa rájatirájasa Sarvalokisurasa Mahisurasa Hima Kadphisasa tradata,*

and I especially noted that the two long titles were certainly intended for *Sarvalokeswara* and *Maheswara*. The only change that I would now make in this reading is in the name of the king, which I think may be read as *Kathphisa*, the cross over the lower limb of the *ph* being probably intended for the cerebral *th*.

Mr. Dowson has altogether omitted the letters immediately preceding the name of Kadphises. I have read them as *Hima* or *Vima*, and have identified this name long ago with the Greek OOHMO. But I have done more than this, I have also suggested that *Wema* is the true name, and that *Kathphisa* is only a title; and further that *Wema* may be identified with the great king *Wen*, from whom no less than ten royal families in Sogdiana and Bactriana claimed descent so late as A. D. 600. We know also that *Yen* and *Wen* are interchangeable pronunciations; from which I conclude that *Wemo Kadphises*, or *Wema Kathphisa*, is identical with the great Yuë-ti Prince *Yen-Kaoching*, to whom the Chinese refer the conquest of India.

The inscription on the Greek side of these coins is invariably the same: BACIAEYC OOHMO KAΔΦICHC. Dr. Hoernle thinks that the objects placed immediately under the bust are letters, and he reads them as MITAC. But in this view he is certainly mistaken, as I have examined numbers of these coins, and have now lying before me two large double stater pieces, on which there is no trace of any letters. I have always taken these shapeless objects to represent clouds, above which is seen the bust of the king.

The figure on the reverse of these coins is certainly *Śiva* himself, and not the *arddhanariswara* figure, half male and half female. In all the androgyne figures of *Śiva* and *Párvati* that I have seen there is a marked line of difference between the two halves of the figure in the dress. But on these coins we have *Śiva* alone, clad in a *dhoti*, and holding a trident in his right hand, and his water-pot in his left, with the panther's skin thrown over his left arm.

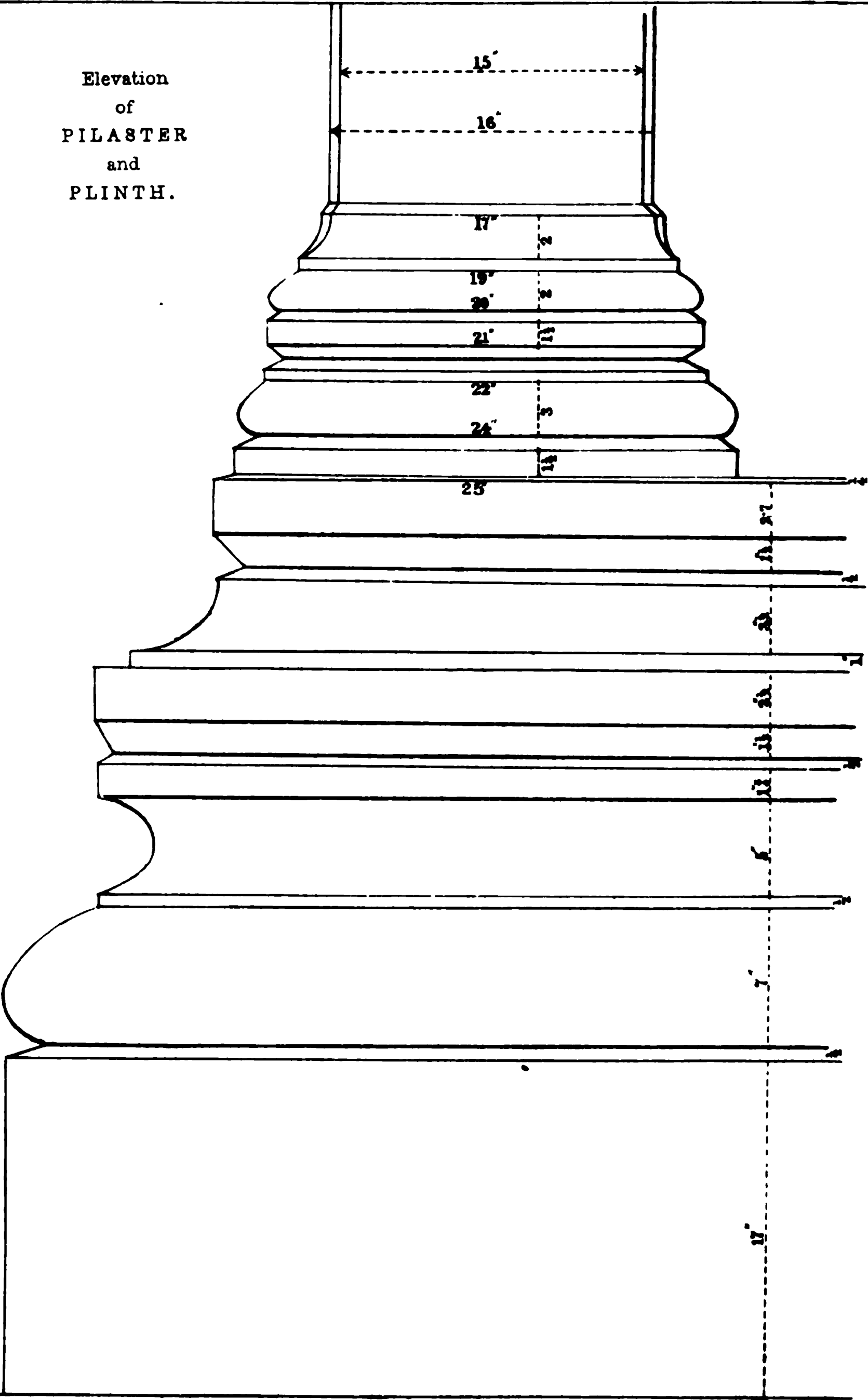


AHIN-POSH STÛPA.





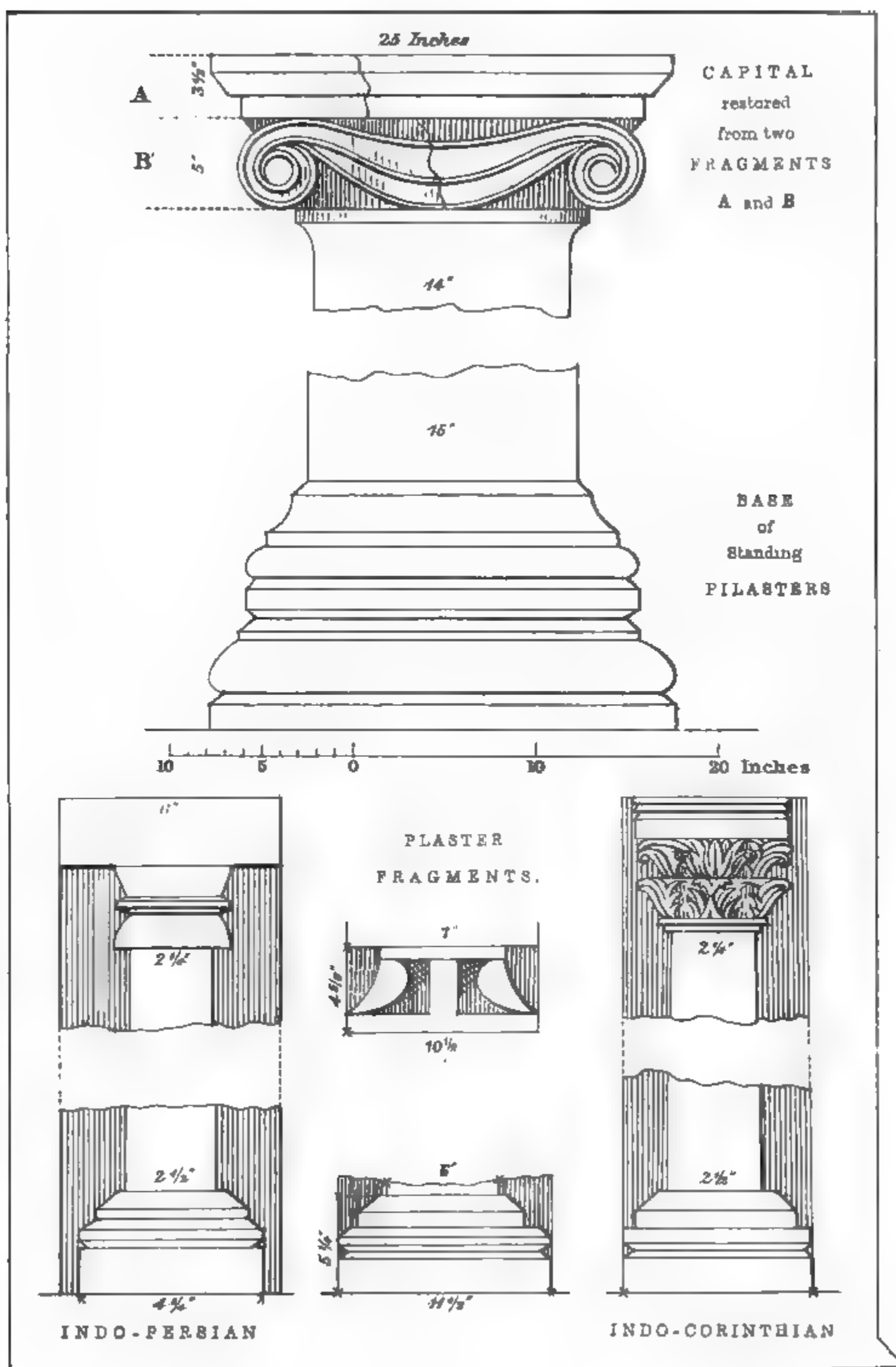
Elevation  
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AHIN-POSH STÛPA.





A. Cunningham, del.

# AHIN-POSH STÛPA.



*Coins of Kanerki or Kanishka.*

There are six coins of the great Kanishka, with various reverses, of which only one is new. Of No. XIV, with the reverse of CAΛHNH, I possess two specimens myself. The other coins with the reverses of Miuro, Athro, and Okro are common.

The new coin bears a figure of Buddha himself standing to the front, with his alms-bowl in his left hand, and his right hand raised in the act of teaching. It is inscribed simply BOΔΔO or Buddha. This coin is unique; but the figure of Buddha has already been made known on his copper coins, of which I possess six specimens. Two of these represent him seated, and the others standing, exactly in the same position as on this gold coin.\* On these copper coins of Kanishka there is a longer inscription reading CAKA-MA\*\*BOΔΔ\* which I take to be intended for *Sákya Maha Buddha*. It will be remembered that two coins of this type were obtained by General Ventura in the Great Manikyala Tope. These passed to James Prinsep, from whom I obtained one by exchange.

The coins of Kanerki differ from those of Wema Kadphises in presenting us with Greek characters only; but in two languages, Greek and Indo-Scythian. The former gives only BACIAEYC BACIAEON KANHP-KOY, of which the other is clearly a translation with the addition of a single word at the end=PAONANO PAO KANHPKI KOPANO. Here *Rao-nano-Rao* is the equivalent of "King of kings," and the last word must be a title of some kind. Dr. Hoernle thinks that "the word *Korano* has not yet been satisfactorily explained." He mentions that "Lassen takes it to be a Greek corruption of *Kushana*, expressing some title," while he himself inclines to identify it with the Greek *Koiranas* a "chief," and especially a "military chief."

It is evident from these remarks that Dr. Hoernle has not seen my identification of the Greek *Korano* with the Indo-Scythian *Kushán*, which was the name of the tribe to which Kanishka himself belonged. I pointed out to Lassen that as *Kanishka* and *Huvishka* became *Kanerki* and *Hoverki* in Greek, where *sh* is changed to *r*, so the *sh* of *Kushán* would be changed to *r* in Greek, and become KOPANO. But my arguments were drawn chiefly from the coins of Kozola Kadaphes or Kadphizes who takes the title of *Zavu* (ZAOOY) of the *Kushán*. Now we learn from the Chinese that *Khieu-tseu-khi* (Kujula) the leader of the one tribe of Kuei-shang, absorbed the other tribes and called himself "King of the Kuei-shang."

\* For both seated and standing figures see my article in the Bengal Asiatic Society's Journal for 1845, p. 430, with its accompanying Plate. Three coins with the standing figure will be found in 'Ariana Antiqua,' Plate XIII, figures 1, 2, 3.

Now the title which all the descendants of *Wen* bore in the 7th century A. D. is given by the Chinese as *Shao-wu*, which I take to be the same as the *Zavu* of the coins. Thus on the coins of Kozola Kadphes we have the following inscriptions :

*Kushanasa Yaiüasa Kuyula Kaphasa.*

Which is simply transliterated in the Greek XOPANCY ZAOOY KOZOAA KAAΔAΦEC. In this rendering it is especially noticeable that where the native spelling of the name begins with *kh* the Greek does the same. But this would not have been the case had the word been intended for the Greek title KOIPANOY.

But this peculiar change of *sh* to *r* is not a *caprice* of the author of the Greek legends of the coins ; but is in strict accordance with a peculiar law of the Turki language by which *sh* and *z* are changed to *r*. We thus see how the *Zavu* (ZAOOY) of Kozola Kadaphes became *Rao* on the coins of *Kanerki* ; and how the titles of *Koranou zavu* and *Rao nano Rao Korano* represent in the most literal manner the title of “King of the *Kushán*,” which the Chinese say was taken by the Indo-Scythian leader.

Dr. Hoernle notes that the title of Koiranos means more particularly a “military chief.” But this term could not have been applied to the Indo-Scythian kings, as we learn from the Chinese that somewhere about A. D. 220 the Great Yuë-ti “put their kings to death, and *substituted military chiefs*.” It seems clear, therefore, that BACIAEYC BACIAEON KANHPKOY and *Rao nano Rao Kanerki Korano*, could not have been a “military chief.”

#### *Coin of Hoverki or Huvishka.*

This is a single specimen of a very common coin of *Hoverki*. I notice that Dr. Hoernle reads the name as Hvirki : but the common form is OOHPKI and if the first O be aspirated, the second O may stand for V. On a few coins the name is spelt OYOHPKI, which can only be intended for *Huverki*.

#### *Roman coins.*

The three Roman coins found in the Ahin-posh Tope are of great importance in fixing a limit to the antiquity of the structure. These coins belong to Domitian, Trajan and the Empress Sabina, the wife of Hadrian. As the last only is of consequence in dealing with the date, it is necessary to ascertain as nearly as possible the period to which her coin may be assigned. On it she takes the title of Augusta, which Orosius says she received at the same time as Hadrian was called Pater Patriæ, which, as we learn from his coins, took place in the very first year of his reign, or A. D. 117. We know, therefore, from this coin of Sabina that the Stúpa of Ahin-

posh cannot be dated earlier than A. D. 120, and may possibly be as late as A. D. 140.

Regarding the Indo-Scythian coins, it is worthy of note that several of the specimens of Wema Kadphises are so very much worn as to have lost 10 grains in weight. Some of Kanishka's coins also are much worn, and the single specimen with Salene on the reverse has once had a ring for hanging it from the neck. The single coin of Huvishka is in very good preservation.

If we regard these Indo-Scythian coins as contemporary with those of the Roman Emperors, then Wema Kadphises cannot be placed much earlier than the reign of Domitian, or about A. D. 70 or 80, while Kanishka and Huvishka would be assigned to 100 and 130 A. D. But I do not consider that there is any absolute necessity for making these Indo-Scythian Princes contemporary with the building of the Stúpa. From all that I have seen of their gold coins I am inclined to think that they must have continued in circulation for more than a century before the issue of the coinage of the later Princes bearing Sanskrit letters. This view is strongly supported by the statements of the Chinese authorities which place the assumption of supreme power by the "king of the Kusháns" not later than B. C. 26; and though they say that he was 80 years of age when he died, it is clear that his son *Yen-Kaoching*, or *Wema Kadphises*, ought to have succeeded to the throne before 25 A. D.

Amongst the plaster fragments from the Ahin-posh Stúpa which I have lately received there is one which, in the absence of the coins, would be sufficient to prove that the Tope was built during the period of Roman ascendancy. This fragment is the corner of a *Roman Ionic capital*. The volute is there, although it has no projection, but the capital is exactly the same on the two adjacent faces, which agrees with the Roman Ionic order, and differs entirely from the Greek. Apparently the whole of the pilasters of the Stúpa must have been of this style, as the size of the capital exactly fits their shafts. In the accompanying Plate (see Plate XI) I have given a restored sketch of this capital with the base of one of the actual pilasters of the Stúpa, as they now stand.

In the same Plate I have inserted several other fragments, some of which I have been able to restore as small examples in plaster of the Indo-Persian and Indo-Corinthian Pillars. Amongst the fragments also there are two acanthus leaves, each with a figure of Buddha seated upon it, as in the fine stone capitals which I have already made known. There are many pieces of large leaves, and of small flowered ornament; but I have found it impossible to fit any two of them together. The stucco of all these fragments is remarkably hard and heavy. All the small pieces were made in

moulds, and laid upon coarse canvas cloth to set. This was most probably done intentionally, as the rough back of the cast would adhere more firmly to the wall when it came to be fixed.

DR. HOERNLE said—

The principal objections of Major-Genl. A. Cunningham to my notices of the coins seem to be those referring to the interpretation of the Arian Pali legend on the coins of Kadphises, and of the word *Korano* on the coins of Kanerki. As to the first, I did not claim the interpretation given by me either as my own or as something new. I mentioned it as being the best of the interpretations hitherto given, and I took it in the main from E. Thomas, who, as I said, does not mention its author. I did not know then, that it was substantially the one given by Genl. Cunningham. I sincerely regret the circumstance; as I should not wish to appear to fail in rendering to Genl. Cunningham that high consideration to which, on account of his long-continued and very successful labours in the cause of Archæological Science, he is so fully entitled at the hands of all who follow similar pursuits. My contribution consisted in the reading of *sagda* for *sarva*. The latter, I admit, accords well with the characters as traced on coins Nos. I to IX. But on No. X the conjunct is traced differently. They may be merely two different forms of the same conjunct (*rv*). In any case the variety is worth noting.

As to *Korano*, I was not unaware of the explanation referred to by Genl. Cunningham. It was in my mind, when I wrote the remark about Lassen. I took it from Lassen, who, I think, omits to mention that he had it from Genl. Cunningham. I can only repeat my sincere regret, that I was misinformed as to the authorship of the explanation. But I must still think, as I thought then, that the identification of *Korano* with *Kushano* has not been satisfactorily made out. I do not say that the identification of *Korano* with *Koiranos* is quite satisfactory either. I only ventured to express the opinion, that the latter identification may yet prove to be correct. The mainstay of the other theory appears to be a certain assumed "peculiar law of the Turki language by which *sh* and *z* are changed to *r*." It is not quite clear, whether this means that what is *sh* or *z* in Turki becomes *r* in Greek; or what is *r* in Turki becomes *sh* or *z* in Pali; probably the former. In either case it does not seem to me, that we really know what the Turki sound was. We have the corresponding sets of names: *Kanerki*, *Hverki* and *Kanishka*, *Huvishka*. Of these, I suppose, the former is the Greek, the latter the Indian equivalent of a Turki name; and clearly the Greek *r* corresponds to the Indian *sh*; but what the Turki sound may have been, which they both equally represent, it seems to me, we do not know. But admitting that law for the sake of argument,



the example just quoted would prove the law only with regard to the interchange of a *conjunct sh* and *r* ; but not as regards *single medial* or *single initial sh* and *r*. In *Kushana* = *Korano*, the letters in question are single medial ; in *zavu* = *ráo* they are single initial. Letters in such different positions may not, *primâ facie*, be treated alike. But further, *zavu* = *ráo* does not appear to me to be an illustration of the law at all. *Závu*, I suppose, must represent a Turki word ; so does *ráo*, if it be identical with *závu*. Now as far as I know, both *zavu* and *ráo* always occur in legends written in Greek characters. It would appear then, that in this case the Turki initial sound, whatever it was, became in Greek (*i. e.*, when it was expressed by a Greek letter) *z* at an earlier period, and *r* at a later period. In the Arian Pali the word appears in the form *yaüasa* ; so that we should get here three interchangeable letters (when single initial), *viz.*, the two Greek *z* and *r* and the (Indian or) Pali *y*, all three equally representing some unknown Turki sound. Or again, if it be said, that *ráo* though *written* in Greek, gives the Indian *pronunciation* of the same Turki word, which by the Greeks was *pronounced* and *written* *zavu* ;—in this case we have an Indian *r* interchangeable with a Greek *z*, both representing some unknown Turki sound (besides being equivalent to a Pali *y*) ; that is, we have a case precisely the reverse of that seen in *Kanishka* = *Kanerki*. Add to this, that it does not seem probable, that *ráo*, standing as it does in close connexion with *raonano*, should not be the well-known Indian word *ráo*, but another form of *zavu*. But whether *zavu* = *rao* be or be not true ; it does not strictly prove the case of *Kushana* = *Korano* ; in so far as the letters do not occupy analogous positions in the two sets of words. I may add that supposing *Korano* to be *Kushána*, it seems strange that the word does not occur in the titles of Kadphises, while it occurs in those of his predecessor (Kadaphes) and his successors Kanerki and Hverki ; yet all belong to the same tribe. If Kadphises dropped it as unnecessary, why did his successors revert to it ? I do not deny that the identification of *Kushána* with *Korano* may yet be proved to be correct ; it only seems to me that the evidence hitherto produced does not warrant it. On the other hand, I confess, I cannot understand, why a great king like Kanerki should not have borne the lesser title of “military chief,” beside the more imposing “king of kings” ; just as, now-a-days, I believe Khán may be found joined with Sháh, or the like. This is not incompatible with the fact, that in later times there were not allowed to be any kings, but only military chiefs.

The remaining points are of less importance. It is very possible that the obscure marks under the bust of Kadphises represent clouds. If so, their apparent resemblance to Greek letters on two of the coins is merely a curious accident. On this point as well as on the following, General

Cunningham's wider experience of such coins must be decisive. I did not, however, ascribe the androgyne figure of Siva to Nos. I—IX, but only to No. X.

No. XIV, with CAAHNH, is not a unique, as General Cunningham himself possesses two specimens ; one of which, as I have since been informed by him, is in even better preservation than the one found in the Ahin-Posh Tope. I cannot, however, make out, whether or not it has been also published. If not, its publication and description now will be welcome to Numismatists.

The name OOHPKI I transliterated *Hvirki*, because I took the first O to represent the aspirate consonant *h*, and the second O the semivowel *v*, that is, OO to represent the conjunct consonant *hv*. Such a conjunct would naturally admit of the slight variations *huv* or *hov*, as in the form OYOHPKI.

As to the age of the Ahin-Posh Tope, General Cunningham places it in the first half of the 2nd century A. D. I was inclined to ascribe it to the first half of the 3rd century, principally to allow time for the travelling of the Roman coins to Afghanistan and their wear and tear ; the SABINA is considerably worn. I do not think we ought to reduce this time too much. But the margin allowed by me may have been too large. Perhaps the 2nd half of the 2nd century A. D. will be a safe date.

5. *A Translation of a Copper-Plate Inscription from Nirmand, in Kulu, with a note on the same.*—By RÁJENDRALÁLA MITRA, RÁI BAHÁDUR, C. I. E., LL. D.

In May, 1878, Major W. R. M. Holroyd, Director of Public Instruction, Panjab, forwarded to the Society a photograph of a copper-plate grant found in the temple of Parashuráma at Nirmand, in Kulu, together with reports on that sanctuary by Messrs. Lyall and Clarke. The photograph, however, was too indistinct to be easily read, I therefore requested a sight of the original, which he subsequently favoured me with. The plate measures 18 × 8 inches. Its left hand corners are broken, the right hand ones rounded, the margins are irregular, and the surface uneven, showing that very little care was taken to prepare it for inscription. In the middle of both the upper and the lower edge, there is a hole for a ring which probably bore the donor's seal and another plate intended to serve as a cover for the inscribed face. The letters on the muniment are but slightly scratched, and very shallow and indistinct.

The inscription extends to sixteen lines, inscribed longitudinally. The letters at the beginning of the first three lines as also a few here and there, are obliterated, and the last two lines are unintelligible. The rest, however, is clear enough, and easily read. The letters are of the Gupta type,

and must date from the 4th or the 5th century A. D. There is, however, no date in the record to verify this conjecture.

The purport of the document is the grant of a village named Súlisha to a Bráhmaṇ of the School of the Atharva Veda, for the use of a temple dedicated to S'iva, by a queen named Mihiralakshmi. Her son Samudrasena is the donor. He was a Bráhmaṇ, who assumed to himself the title of *Mahásámanta*, "great commander," and *Mahárájá*, "great king;" these titles are also assigned to three of his ancestors, whose names are, in the ascending series, (1) Ravisena, (2) Sanjayasena, (3) Varuṇasena. Who these worthies were I cannot ascertain. They were probably petty chieftains of the Panjab, where even at that early date Linga worship had become widely prevalent.

#### *Translation.*

Born in the year — of the celebrated king, of him, whose glorious deeds had spread far to the four oceans, whose feet had become resplendent with the reflection of the crown-jewels on the bended heads of many chiefs of great armies, who had celebrated great sacrifices, of the mighty commander and great king S'ri Varuṇasena. His son and successor, born of her majesty Praváliká, the great goddess, (was) his father's rival in merit, the mighty commander, and great king S'ri Sanjayasena. His son and successor, born of her majesty S'ikharasvámíní, the great goddess, (was) the hero of a hundred battles, the mighty commander, and great king S'ri Ravisena. His son and successor, born of her majesty S'ri Mihiralakshmi, the great goddess, (was) the delighter of mankind like the autumnal moon, the bestower of gifts to those who are overpowered by powerful enemies, the kind to the poor, the merciful to the decrepit, the great devotee of Mahes'vara, the great Bráhmaṇ, the devoted friend, the mighty commander, and great king S'ri Samudrasena. He, for the enhancement of the virtue of his mother Mihiralakshmi, and for the service of the lord, the destroyer of Tripura, the giver of light to the world, the beneficent to those who bow to him, \* \* \* the divinity established at Kapiles'vara, and named after his mother Mihires'vara, *alias* Kapáles'vara, for his daily supply of sacrifices, boiled rice, offerings, flower garlands, incense, aromatics, lamps, and for occasional repairs, to Stoma, a Bráhmaṇ of the school of the Atharva Veda \* \* \* has granted, for the period of the duration of the sun, the moon and the stars, the village of Súlisha, extending as far as the dependencies\*

\* The boundaries described are unintelligible to me. The word *Kuṭumba* is in Sanskrit usually employed to indicate a kinsman, it does not mean a dependency in the sense of an adjoining piece of land, but it has been repeatedly so used in the text as to leave me no alternative but to use it in the latter sense. The names of the places are such as to be quite unintelligible.

of Vakkhalika in Navavaidila, including the grazing ground of Paribhuta in the dependency of Phakkasvatálápur, and the dependencies of Salabha, as also the ground in the village of Súlisa presented by Mahárāja Sarvadharmā, the first founder of (the temple of) Kapáles'vara, and the plot of ground granted by my mother Mihiralakshmi, with all its level lands, waters and jungles, along with its inhabitants, its hills, its boundaries, its grass and timber, its water-courses, and religious buildings. Knowing this it should be the duty of (all future) kings and their dependants, whether of my kingdom or otherwise, for the good of all to uphold this (grant); for whoever will undo, or set it aside, or rob it, will be guilty of the five great sins as well as of all minor sins. It has been said, "Many kings including Sagara and others, have owned the earth: to whomsoever the earth belongs for the time being, to him belongs the fruits (of such gifts). The donor of land enjoys heaven for sixty thousand years, and for so many years the destroyer and resumer thereof dwells in hell. Whosoever resumes land, whether given by himself or by another, is born a maggot in ordure for sixty thousand years." This was written in the presence of Nihilapati and Kus'alaparakás'a, by Udyotárka. (The last two lines are unintelligible.)

*Transcript in Nágari Character.*

- १ । ————भिख्यातनरपतिवर्ण(र्व)जः समभवच्चतुस्रदधिसमतिक्रान्तकीर्त्तिरनेक-  
सामन्तोत्तमोत्तमावनतमुकुटमणिमयूखविष्कुरितचरणारविन्द-
- २ । —————क्रतुयाजो महासामन्तमहाराजश्रीवत्सलसेनस्तस्य पुत्रस्तत्पादा-  
नुध्यातः परमदेव्यां प्रवर्तिकाभट्टारिकायामुत्पन्नः पित्रैव तुल्योगुणैर्म-
- ३ । हासामन्तमहाराजश्रीसञ्जयसेनस्तस्य पुत्रस्तत्पादानुध्यातः परमदेव्यां शिख-  
रस्वामिनीभट्टारिकायामुत्पन्नः समरशतलब्धजयः × × म-
- ४ । हासामन्तमहाराजश्रीरविशेखस्तस्य पुत्रस्तत्पादानुध्यातः परमदेव्यां श्रीमि-  
हिरलक्ष्मीभट्टारिकायामुत्पन्नः शरदमलसकलरजनिकर इव प्राणि-
- ५ । नां समाङ्गादनकरः समुन्नताशेषरिपुराशिव(म)ताम् प्रार्थितफलप्रदो दीन-  
नाथातुरदयालुः परममाहेश्वरोतिब्रह्मण्यः परार्थैकरतो महासामन्त-
- ६ । महाराजश्रीसमुद्रसेनो जननोश्रीमिहिरलक्ष्म्या धर्मार्थं भगवतस्त्रिपुरान्त-  
कस्य लोकालोककरस्य प्रणतानुकम्पिनः सर्व + + + यकरे(?) कपाले-
- ७ । श्वरे जननीप्रतिष्ठितस्य श्रीमिहिरेश्वरस्य कपालेश्वरबलिचरसत्रस्रग्धूपगन्ध-  
दोषिदानाय सततं श्रीसुखगुडस्फुटितसाधनाय च नि-
- ८ । र्मगडा(श्या(?))याहाराथर्वणब्राह्मणस्त्रोमाय सूलिसग्रामनववैदिककर्मन्तव-  
क्खलिककुटुम्बितादेसभूमिपर्यन्तपरिभूतनाम्ना फक्कश्वतालापुर-

- ६ । ककुटुम्बिताद्वेसभूमीसोद्रगाससीमान्तपर्यन्तसलभककुटुम्बदिन्तकुटुम्बश्च ।  
कपालेश्वरदेवस्य पूर्वप्रतिष्ठायां महाराजसर्वधर्मेण सु(भू)मी दत्ता ।  
सूक्तिसयामस्य श्रीमिहि-
- १० । रणक्षप्राप्तस्याः समैदकजार्गल\* भूमीसमेतमशेषं सप्रतिवासिजनसमेतं सो-  
द्रगै† स्वसीमद्वयकाष्ठप्रखवणयूतीपर्यन्तं देवाग्रहारश्च ता(?) च-
- ११ । न्द्रार्कतारासमकालीनं प्रतिपादयति स्म विदित्वैतद्राजभिस्तदाष्ट(त्रि)तजने-  
नाधिकृतानधिकृतेन हितमिच्छता प्रतिपालनीया यत्त्वेषां कुत्थात् परिपश्यन-  
मपह-
- १२ । रणं परोपद्रवं वा स पञ्चभिर्महापातकैरुपपातकैश्च संयुक्तश्च ॥ उक्तश्च बडभि-  
र्वसुधा भुक्ता राजभिः सगरादिभिः । यस्य यस्य यदा भूमिस्तस्य तस्य  
तदा-
- १३ । फलं ॥ षष्टिवर्षसहस्राणि स्वर्गे मोदति भूमिदः । आच्छेत्ता चानुमन्ता च  
तान्येव नरके वसेत् ॥ स्वदत्तां परदत्ताम्वा यो हरेत् वसुन्धरां । षष्टिवर्ष-
- १४ । सहस्राणि विष्ठायां जायते क्षमिरिति ॥ स्थितोत्र मिहिलपतिः कुशल-  
प्रकाशश्च । लेखकोत्र उद्योत चर्कश्च गणसौख्यसधन × खे सुदिया(?)
- १५ । राष्ट्रसमेतैस्त्रेयं दत्तिः परिपाल्या ऐ + + कात्र उद्यानस्थावरवादित्रग-  
विश्वसहस्रउपणव-
- १६ । कगललटटिकतद्वयमिहिरणक्षप्रतिपादन इति

6. *Coins of Ghiás-ud-din and Mu'az-ud-din-bin-Sām.*—By DR. C. L. STULPNAGEL, Professor, Government College, Lahore.

(Abstract.)

This paper begins with a brief historical notice of Ghiás-ud-din of Ghor and his younger brother Mu'az-ud-din, the first Pathán king of Delhi. It then describes eight silver coins, bearing the joint names of those two rulers. One of them, dated 597, closely resembles No. 1, Pl. I, in Thomas' *Pathán Kings of Delhi*, differing only in bearing the date on the *Obverse*. Two others, dated 596, resemble No. 35, Pl. XX, in Wilson's *Ariana Antiqua*. The remaining five coins have never before been described and are quite of a new type. They are binominal; weight 75-77 grains. The area on either side is a square composed of double lines, with the inscription arranged in five lines. The enclosing margin, in four sections, is bounded by double circles. They are dated 596, 597 and 598 A. H. None contains the place of mintage.

This paper will be published in the Journal, Part I.

\* समोदकजार्गल (?)

† साद्रग

7. *Notes on a Collection of Reptiles and Frogs from the neighbourhood of Ellore and Dumagudem.*—By W. T. BLANFORD, A. R. S. M., F. R. S., F. G. S.

(Abstract.)

In this paper 33 species of reptiles and 7 frogs are enumerated. They were collected on the Godávári, near Dumagudem (the engineering station at the first barrier) or between Dumagudem and Ellore, in the months of February, March, April and May, 1871. The new species were described by Dr. Stoliczka and some notes have been published, but others remain, and as these throw some light on geographical distribution or on the habits and structure of the animals, they are included in the present paper. The list of lizards (15 species) is doubtless much more nearly complete than that of the *Ophidia* and *Batrachia*.

This paper will be published in the Journal, Part II.

8. *Notes on a Collection of Reptiles made at Ajmere, in Rájputána,* by MAJOR O. B. ST. JOHN, R. E.—By W. T. BLANFORD, A. R. S. M., F. R. S., F. G. S.

(Abstract.)

In this paper 24 species of reptiles collected or observed by Major St. John at Ajmere, are enumerated. The most interesting are a *Varanus*, supposed to be a variety of *V. lunatus*, with reference to which the distinctions between *V. dracæna* and *V. lunatus* are discussed; *Ophiops microlepis*; *Euprepes monticola*, (proposed to be re-named *E. guentheri*, as the original name is misleading); *Hemidactylus triedrus* (?); *Cynophis helena* and *Python molurus*. It was not previously known that the two last named genera were found in Central India.

This paper will be published in the Journal, Part II.

9. *Notes on Reptiles.*—By W. T. BLANFORD, A. R. S. M., F. R. S., F. G. S.

(Abstract.)

This paper contains a few desultory notes on various species of lizards and snakes, collected in different parts of India and the neighbouring countries. The only form described as new is a species of *Hypsirhina* from Pegu, thus distinguished.

HYPsirrhina MACULATA, sp. nov. Near *H. Chinensis*, but differing in having 25 rows of scales instead of 23 and only 125 ventrals. Head short, snout blunt, truncated, tail compressed. The praefrontal is rather

smaller than either of the postfrontals ; præocular 1 ; postoculars 2. Colour ashy brown with a row of large irregular black spots down the back and another rather smaller row on each side ; under parts whitish with a dusk band down each side of the ventral shield.

The single specimen examined is 12 inches long and was sent from Bassein in Pegu by Captain Spearman.

MAJOR WATERHOUSE said that before the meeting closed he wished to say a few words, to express the regret of the Society that they were about to lose the services of their President, Mr. W. T. Blanford, who was going on leave to Europe almost immediately, and this was the last occasion on which he would be present among them for some time. He need not enlarge upon Mr. Blanford's labours and the support he had given to the Society during his long connection with it, as they were sufficiently evidenced by the number of papers from his pen that had been published in the Society's Journal. But he could not allow Mr. Blanford to leave without a warm acknowledgment of the cordial help he, as Secretary, had always received from him, and of the care and attention he had devoted to the interests of the Society during the time he had been President. He would therefore beg to move that the thanks of the Society be given to Mr. Blanford for his services as President.

The vote was carried unanimously.

The receipt of the following communications was announced :

*Geographical Information regarding the Kirghiz Steppes and country of Turkistan, afforded by the Book of the Great Survey.*

*Alphabetical Index to the Geographical Names in the Kirghiz Steppes and in the country of Turkistan which are contained in the Book of the Great Survey.*

*Information regarding the Freezing and Thawing of the Waters of the River Yenisei below the town of Yeniseisk.*

*Sketch of the Geographical Investigations in Asiatic Russia. Translated from the Russian of Venukoff.*

The above are translations of papers in the Proceedings of the Imperial Russian Geographical Society, by CAPT. W. E. GOWAN, H. M.'s Indian Army.

*Notes on the Survey Operations during the Afghan Campaign of 1878-79. Compiled by MAJOR J. WATERHOUSE. Communicated by Major-General J. T. WALKER, C. B., R. E., Surveyor General of India.*



*Note on an Inscription from the Gate of the Kṛishṇa-Dvāraká Temple at Gayá.*—By RÁJENDRALÁLA MITRA, RÁI BAHÁDUR, C. I. E., LL. D.\*

Three months ago I received from Mr. E. J. Barton, Collector of Gayá, an ink impression of an inscription existing on the gate of the Kṛishṇa-Dvāraká temple in the neighbourhood of the Vishṇupad at Gayá. In forwarding it, Mr. Barton said: "It appears that in the Buddhistic times, formerly there was a temple in which there were images of Kṛishṇa and Mahádeo. Fifty years ago it was pulled down by one Dámodar Dhokri Gyawál, and a new edifice built in its place. Many Bráhmans were sent for, and asked to decipher the inscription, which they could not do. I shall be much obliged if you can favour me with a translation of it." The inscription was not new to me, as I had seen it in 1864, and brought a facsimile of it. I did not, however, notice it, as my facsimile was very unsatisfactory, and I hoped to visit the place again and read the record in *situ*. General Cunningham noticed it in 1872, and published a facsimile in the third volume of the 'Archæological Survey Reports' (plate XXXVII). His account of it runs thus: "The inscription consists of 18 long lines of well-cut Kuṭila characters. It opens with the invocation—*Aum namo Bhagavate Vāsudevāya*, and ends with *Kirtti*. Near the end of the last line is found the Rájá's name, S'ri Naya Pála Deva, and the year of his reign, *daśapanche Samvatsare*, the 15th year. This inscription, with the exception of a few slight injuries in the middle, is in excellent preservation, and is a fine specimen of sculptured lettering. As it is not mentioned by Buchanan in his account of the temple of Kṛishṇa Dvāraká, it was most probably discovered after his time; but under any circumstances it has no connexion with the temple to which it is now attached."

Judging from the reduced facsimile published by General Cunningham, and the ink impressions taken by me and by Mr. Barton, the record appears to be far from being "in excellent preservation." There are breaks in almost every line, and lines 10 to 15 are all but wholly illegible, my reading and translation of the record are, therefore, very fragmentary, and far from being satisfactory. As the record, however, is of the time of the Pála Rájás of the 11th century and bears a date, it is worthy of preservation even in its fragmentary state.

The idea of its being a Buddhist record has arisen from its being connected with the Buddhist Pálas; but from what I have been able to make of it, it has nothing to do with Buddhism. It opens with an invocation to Vāsudeva, or Kṛishṇa, and distinctly names Vishṇu as the divinity for whom the temple which bore it was built. It goes further, and mentions the blue colour and the yellow raiment of the divinity. Around this temple

\* Read at the July Meeting.



there were several minor ones, erected at the same time for the accommodation of lingams.

The dedicator of the temple was one Soma, a petty zamindár, who could venture to assume only the very moderate and equivocal title of *adhipa*. His genealogy as given in the record included the names of several generations; but, six lines in the middle being illegible, I cannot guess how many names have been lost. The founder of the family was an adorer of Śiva, but his name, apparently one of two syllables, is illegible. His son was S'údraka, and grandson Vis'váditya. Soma was the descendant of the last, some unknown generations removed.

The only remarkable circumstance connected with the last was the encouragement he gave to the study of Sahadeva's treatise on the veterinary art. Whether Sahadeva wrote anything himself on the subject or not, does not appear. I have by me two codices of a work on the diseases of horses by Nakula, and have seen the treatise quoted in other works on the subject, but I have never heard of Sahadeva having been an author. He was, however, the twin brother of Nakula, and the two were the natural sons of the celestial veterinary surgeons, the two Ásvins, and it is very likely that the work of Nakula also passed in the name of his twin brother.

According to the calculations published by me in my paper on the Pála Rájás (Journal for 1878) Nayapála began his reign about the year 1040 A. D., immediately after Mahipála, and was the person from whom Vijayasena wrested the kingdom of Northern Bengal. The fifteenth year of his reign fell in the middle of the sixth decade of the 11th century.

The engraver of the record was one Saṭhṭhasoma, and the size of it is 30 × 13 inches.

### *Translation.*

Line 1. Om. Salutation to the Lord Vásudeva. May that Vishṇu, whose body is as resplendent as a multitude of new-blown blue lotuses, whose yellow robe is charmingly bright like gold, (whose praise) is sung ——— (preserve) you.

2. Having made the Bráhmans happy with whatever they wanted, the lord of the people, adorned with every good quality, and residing with the highest glory as if in heaven, himself prepared a material image of Vishṇu, and unbarred the gate of salvation by high temples, charmingly white as the cloud of autumn.

3. They sing ——— Resounding the loud voice of the Bráhmans reciting the Vedas ——— further, the air was darkened by volumes of smoke emanating from the incessant homa offerings. Where virtue ———

4. has found an asylum from the dreadful fear of Kali in this age. With highly-prized social qualities, exquisitely beautiful, the noble Bráhma-man ———

5. He, who was the noblest of Bráhmans, because stainless, (or who bears on his head a stainless moon,\*) who was adorned with various ornaments, (or profusely smeared with ashes,) who was the adorer (or beloved) of the daughter of the mountain king (Durgá), was named ——— With many unrivalled lofty temples the source of three-fold blessings dispersed in various parts

6. of the earth, and resplendent as the nectariferous light of the autumn, his glory was enveloped. Of him was born Súdrika, the delight of Bráhmans and his dependants, himself dependent on none, (or master of the twice-born (bird), the son of Vinatá, and (the possessed of Lakshmí,) the protected of Lakshmí, who was like unto the enemy of Mura (Kṛishṇa).

7. By his fame, white as the Kunda flower seen in a distant garden, in the autumn season, the surface of the three regions was filled as with camphor, or smeared as with sandal-paste, or inundated as with the waves of the milky ocean.

8. True religion ——— good sense, as that of the priest of the gods, ——— resplendent with glory. These were his qualities. Viśvāditya was born his son.

9. And in him every thing found an asylum, ——— manly glory like the rising sun ———

10 to 15. (Illegible except a few words here and there.)

16. Pressing down the majesty of the (highest) peak of the Kailása mountain, his glory was ascendant, his fame was spotless as the driven snow, his body was comparable to the moon. Where, by the spotless rays of the autumnal moon on the top of the lofty peak ———

17. The treatise of Sahadeva, the veterinary surgeon, his work on the saving of life, which is like a mistress in the heart of a good man who is perfect in love, friendship, and pleasure. The self-earned glory of the king Śrī Soma

18. was made manifest by the clever artist Saṭhṭhasoma. When the weight of the empire of the whole earth was borne by Śrī Nayapála Deva, in the year ten and five (fifteen) of his reign (*samvatasare*) this accomplished noble deed was recorded.

\* The matter of this and the following line is very obscure owing to the epithets used having been designed to serve as *double entendre* applying once to Śīva and Viṣṇu and next to the founder of the family and his son.

## Transcript in Nāgarī Character.

- १ । ॐ नमो भगवते वासुदेवाय ॥ उन्निद्रनीलकमलाकरकायकान्तिः स्वर्णाभि-  
रामश्चिरद्युतिपीतवासाः । उद्गास्यमानश्च ————— विष्णुः —————  
युष्मान् ॥
- २ । ध्यानिर्माय समस्तवस्तुसुखिनो विप्रान् प्रजानां पतिर्धामध्यास्त इवात्मनैव  
परितो मूर्त्तिप्रपञ्चं दधत् । उत्तुङ्गैः शरदभ्रशुभ्रशुचिभिः सौधैः कृतालङ्कृति-  
र्माक्षद्वारमनर्गलं ज-
- ३ । गति सा × × तया गीयते ॥ वेदाभ्यासपरायणद्विजगणोद्गोर्णाग्रपाठक्रमादु-  
च्चैश्चरितध्वनित्यतिकरैः ————— । किञ्चाजखितहोमधूमपटलध्वान्ता-  
वृतौ साम्प्रतं धर्म्मो
- ४ । यत्र महाभयादिव कलेः कालस्य सन्तिष्ठते ॥ अत्यादृतैर्गुणनयैः — सन्दोह-  
सुन्दरमहाद्विजराज × × ॥
- ५ । अजातलक्ष्मद्विजराजशेखरः समुन्नतो भूरिविभूतिभूषणः । बभूव धन्यो-  
गिरिराजपुत्रिकाप्रियोयमेवः परितो × सं × कः ॥ अनन्यसामान्यदिगन्त-  
मन्दिरैः त्रिवर्गसंसर्गिगुणा-
- ६ । श्रयैर्जगत् । शरत्सुधाधामगभस्तिभास्वरैः समुन्नतैर्यस्य यशोभिरावृतं ॥  
द्विजवरविनतानन्दननिरन्यगतिकः समाश्रितो लक्ष्मणा । तस्य तदनुतनुजन्मा-  
मुररिपुत्रिव श्रूद्रको भूतः ॥
- ७ । दूरोद्यानशरत्सुधानिधिसुधाकुन्दाभिरामश्चविद्याप्तैः शुद्ध × × यशोभिर-  
भितो यस्य त्रिलोकीतलं । कर्पूरैरिव पूरितं मलयजव्रातैरिवालेपितं × ×  
क्षीरपयोधितुङ्गलहरीभेदैरिवान्ना-
- ८ । वितं ॥ सत्यं धर्म्म ————— शुभा मतिः सुरगुरौ तेजस्विता भास्वति ।  
एते सन्ति गुणाः — विद्यादित्यमजीजनत्सुतम-
- ९ । सावेभिः समस्तैः श्रितं ॥ ————— उदयाश्रितोरविरिव प्रौढप्रतापो-  
दय —————
- १० ।
- ११ । ————— चारविकलोजगो ————— यस्य श्रीः समुचितवि-
- १२ । कासात् सुदयिनीय ————— उद्गीयमाना जनैः ।  
सानन्दोत्पुलकं वि-
- १३ । मानमसकृद्देवै ————— कुलानि प्राप्नुवन्ति  
निध-
- १४ । नानिव — ॥ निनदमिद ————— यस्य नयस्य वि ×

- १५ । × ॥ आजन्मान्तक ————— सतिशक्तस्य  
 १६ । ————— ॥ कलासाचलशृङ्गसम्भ्रममधः कुर्वत् प्रकर्षोदयप्राप्तयेद्युतिहृन्दसुन्द-  
 रयशःचन्द्रोपमेयाकृतिः । यत्रोत्तुङ्गशिखायसङ्गतशरच्चन्द्रांशुशुभ्रश्रिभिः (?)  
 × × नूतनमञ्जरी + + + +  
 १७ । ————— ॥ वाजिवैद्यसहदेवनिरुक्तिः तत्प्रशस्तिरियममुनिदानं  
 प्रेमसौहृदसुखैकधरित्रीसज्जनस्य हृदये रमणीव ॥ श्रीमतोऽधिपसोमस्य  
 आत्मजन्मार्जितं यशः । उ-  
 १८ । त्वीयं कर्मणि श्रीमत्सदृशेनेन शिष्यिना ॥ समस्तममङ्गलराज्यभारमावि-  
 भ्रति श्रीनयपालदेवे । विलिख्यमाने(?ना)दशपञ्चसंस्थसंवत्सरे सिद्धिमत्  
 सादुकीर्तिः ॥

*Geographical information, regarding the Kirghiz Steppes and Country of Turkistan, afforded by the Book of the Great Survey.\* Translated from the Russian by CAPTAIN W. E. GOWAN, H. M.'s Indian Army.*

The relations of our fatherland with the country of Turkistan are very ancient, for they date from a period prior to the formation of what is now the Russian Monarchy. The numerous hoards of Asiatic coins, relating to times between the 7th and the beginning of the 11th century (not later than the year 1012), that have been found in Northern Russia, in the tract of country stretching from the province of Kazan, (in which dwelt the Bulgarians of the Volga,) to the Baltic Sea and along the shores of that sea, testify that, during this period, an active trade was carried on between Central Asia and Northern Europe through the country which is now called Russia.† Some have supposed that this trade altogether ceased in the beginning of the 11th century in consequence of the fall of the Khazai Empire, which possessed the low lands of the Volga ; a fall which followed the defeat of the Khazai Army by the Russian Grand Duke Sviatoslaf in the year 969. But in reality this trade did not entirely cease, it merely stood still and grew slack. For, at any rate, in the 12th and 13th centuries Khivan and Boukharian caravans made their way into Russia.‡ To our trade relations with Central Asia there were added, from the

\* Taken from Part I of Vol. XIV, of "Proceedings of the Imperial Russian Geographical Society."

† "Russia and Asia" by V. V. Grigorieff, St. Petersburg, 1876. See passages relating to the Cufic coins found in Russia and the countries bordering on the Baltic (1841).

‡ Bulletin du Congrès international des Orientalistes—Session de 1876, à St. Petersburg, 1876. See pages 54, 55.

latter half of the 13th century, those political events which ushered in the two-century dominion of the Mongol Tatars or Tartars over Russia. But with the throwing off of that yoke, the confines of our Empire advanced with swift strides and with that extension increased the influence of Russia in the East. In the 16th century the Government of Moscow subdued Kazan (1552) and Astrakhan. Since then the free Cossacks, by moving from the valley of the Don and settling on the Volga, the Yaik (1580), the Terúk and in Siberia, have extended still more the confines of Russia.

Our steady connection, both mercantile and political, with Central Asia has in the course of several centuries given us the power to enlarge by degrees the circle of our geographical knowledge of that part of the world. We have learnt much by questioning the natives of the countries of Asia both far and near who have visited us, but we have learnt still more from the journeys to such lands of our own countrymen. We, unfortunately, are not in possession of complete knowledge of all these journeys,\* much less of the geographical results of each of them. We therefore are not able to follow, step by step, the gradual collection of Russian geographical knowledge regarding Central Asia. Nevertheless we do possess a sufficiently full treatise of the knowledge obtained in the 16th century. This treatise must be reckoned the first complete and purely geographical work put together in Russia. We allude to the Chart of the entire Sovereignty of Moscow and of the adjacent countries, called "the Great Survey," and to the compilation explanatory of the Chart entitled "the Book of the Great Survey." The Chart has not come down to us, but the Book has been printed several times.

In the preface to the last edition of the Book of the Great Survey,† Spasski furnishes particulars as to the date of the completion of the Chart and of the explanatory book and of its later editions. The beginning of the Survey relates to the reign of John IV, who "in the year 1552 ordered the land to be measured and a survey of his kingdom to be made."‡ In the time of Borís Godoonóff, that is, in the last years of the 16th century, the Survey was enlarged, and during the reign of Michael Theódorovitch, or about the year 1627, the Ancient Survey "fell into complete disorder, so that henceforth it was not possible to determine the borders of the country

\* Amongst the number of such travels, the journey to the Khanates of Khiva and Boukhara of the Englishman Jenkinson in 1558-59 cannot of course be reckoned, even though it was carried out from Moscow, and this because it belongs more to Europe than to Russia. If moreover it had an influence on the circle of our information regarding Central Asia, that influence was very limited.

† The Book of the Great Survey spoken of was issued, under the auspices of the Imperial Society for inquiring into the History and Antiquity of Russia, by Spasski. Moscow, 1846.

‡ History of Russia by Tatishtsheff, Vol. I, page 506.

by an examination of it." It then became indispensable "by adhering to the measurements of the old Survey to make out a new Chart of the entire Sovereignty of Moscow and of all the districts of the kingdom." It was thus that the Book of the Great Survey came to be compiled, a work which, as already has been said, is explanatory of the Chart. Both on the Chart and in the Book "the standard of measurement is calculated in versts." In the year 1680 the Survey was made afresh, with such amplifications as the then condition of Russia required. Later on, that is, in the year 1773, there was issued a work by M. N. I. Novikoff, entitled "Ancient Russian Hydrography." Again, in the year 1792 there appeared a description of the Survey of the year 1627. This was called "Book to accompany the Great Survey." In 1832, M. Yazikoff published first editions of both the two works last mentioned. Spasski, in his edition of 1846 (see note †, p. 223), availed himself not only of these publications, but also of eight manuscripts published during the close of the 17th century, *i. e.*, after the year 1680. All existing differences between the printed editions and those in manuscript in relation to proper names, number of versts, omissions, additions, &c., he has noticed in the observations at foot of the text, whilst the explanations concerning the various subjects mentioned in the text have been inserted at the end of the book.

Regarding the scale of measurements, Spasski is of opinion that the versts of the Great Survey do not always agree with the modern verst of 500 "sajens,"\* and that the former may in some cases measure as much as 700 and 1000 "sajens," and hence they should be corrected by copyists according to the more modern scale. When expressing this opinion, Spasski evidently knew nothing about the researches of Booktoff into the ancient Russian linear and itinerary† measurements, in which it is shewn that our verst in days of yore was made up of 500 sajens of 3 arshins or 7 feet.

The information regarding the Kirghiz Steppes and the Country of Turkistan takes up nearly a whole chapter (pp. 69-76) of the Book of the Great Survey. On p. 158 we find "hordes of nomad Cossacks, the land of Urgentch and the land of Boukhara mixed up with the river Yaik." Intelligence of this kind is met with too in other passages of the book (p. 151 and 217, 218). Spasski has appended notes to such passages (see pp. 59-71, 172 and 218, 219), and many other writers on Central Asia have also commented on several revelations of the book before us. But no one has yet thoroughly analyzed these revelations, and therefore many of them have escaped that attention which they have merited, whilst others again have either remained altogether unexplained or imperfectly

\* 7 English feet.—*Translator.*

† *Journal of the Minister of Home Affairs*, 1844. No. 11.

interpreted, owing no doubt to the insufficient knowledge of the country hitherto obtained. I propose, therefore, to thoroughly analyze the subject *de novo*, and shall compare much of what is written in the "Book of the Survey" concerning the Kirghiz Steppes and country of Turkistan with the modern information on the subject.

After a description of the Yaik, or the modern Ural, and of the tributaries on its right bank, we read (p. 69), "And opposite those rivers, on the left bank of the Yaik, is the mouth of the Izlay." Now in other passages of the book, this river is called the Ilez or the river of Ilek.

"Above the river Izlay, at the termination of the Arattova mountains, the river Vor issuing from Mount *Urúk* falls into the Yaik. From the same mountain issues the river Irgíz and falls into lake Akbashli." In another part of the book of the Great Survey, we read (p. 72). "Mount *Urúk*, which is 70 versts long, is distant from the Blue Sea (Sea of Aral), 300 versts. From this mountain issue three rivers; the Vor, which flows into the Yaik; the river Irgíz, which flows eastward into lake Akbashli; the river Hem, which flows towards the Caspian Sea and falls into the lake without descending to that sea." Mount *Airúk*, which has been very happily chosen for explorers, is the highest point in the *Múgodjarski* range and is equidistant (250 versts) from the mouth of the Or and from the northwest extremity of the Blue Sea or Sea of Aral. But in the "Book of the Great Survey," the appellation of mount *Airúk* is extended to the entire range which stretches 150 versts north and south. From the *Múgodjarski* mountains, which surround the peak of *Airúk*, there flow: to the north the river Or, to the east one mouth of the Irgíz, which is known as the *Chit-Irgíz*, and to the south the *Emba*.\*

The river Or falls into the Ural "at the extremity of Mount *Araltova*." But what is this mountain? *Spasski* supposes (*vide* his note 58) that this is the range which extends to the Sea of Aral; in other words that it is the *Airúk* or *Múgodjarski* range, but from three other passages in the work in which mention is made of Mount *Araltova*, one would sooner suppose that the range in question is that portion of the Ural chain which runs along the right bank of the river Ural and which terminates in the *Guberlinski* hills.

The river Irgíz falls into the lake, which in former maps and in the old description of the Kirghiz Steppes by *Richkoff* and *Tevshin*† is called *Ak-Sakal-Barbi*, a name somewhat similar to that given in the "Book of the Great Survey." But it is not known why on the newest Charts and in the

\* *Vide Richkoff's "Topography of the Province of Orenburgh." St. Petersburg, 1762, Part I, page 214.*

† *Vide Tevshin's "Description of the Kirghiz-Cossack hordes and of the Kirghiz Steppes." St. Petersburg, 1832. Part I, page 82.*



descriptions of Blaramberg\* the name of the lake spoken of should have been changed into Chelkar-Dengis, a designation common to many lakes in the Kirghiz Steppes. Blaramberg reckons that there are four Chelkars in the Orenburgh Steppes and Selverhelm says there are three† in the Siberian Steppes. The word "dengis," in Russian "móre" (a sea), is inserted in maps to denote either lakes of a considerable size, or to signify that the body of water alluded to has a bitter or brackish taste. In the more modern descriptions of the Orenburgh Steppes by Meyer, a lake in one place is called "Chelkar," and in another "Ak-Sakal-Taúp." The Kirghiz use the latter designation, whilst the Russians used to call a lake in those parts Ak-Sakal-Barbi. No doubt by mistake the word came to be applied to fresh water-lakes.‡ The "Book of the Great Survey" here goes on to speak for the second time of the mouth of the river Emba. Let us now turn to the further indications of this book relative to the river Irgíz and lake Akbash-li. (p. 69.)

"And opposite those rivers (the Urúk-Irgíz and others) the river Saúk falls into the same lake on the left side after receiving the waters of the Bozin-Hinchal-Ilgén." The omission from modern maps of the Saúk and Bozin does not give us the right to conclude that this indication is wrong. The conversion of Ak-Sakal-Barbi or Ak-Sakal-Taúp into Chelkar has already shewn us how completely without rule are names sometimes changed. In the word Ak-Sakal-Taúp we are supposed to hear still the sound of the Saúk of the "Book of the Great Survey." In like manner the fact that the names of the mountain Búzún Khán, and of the Búzún sands, which, whilst marked on Tevshin's map of the Kirghiz Steppes as more to the north than Ak-Sakal-Barbi, *i. e.*, about Polkoyak and Túrgaya, are altogether omitted from modern maps, shows that the name of the river Bozin was not an invention of the "Book of the Great Survey." We find in the following testimony of Abul Ghazi Bahádur Khán a confirmation of the existence of the river Saúk. Baty, on his return from Russia (about the year 1243), when assigning a lot to his youngest brother, Saiban Khán, says: "Thou wilt have the entire country, which lies between the possessions of my eldest brother Idyen my own: thou wilt pass the summer on the Irgíz-Saúk, or, Ilel and east of the Yaik almost to the Ural mountains and the winter in Kara Kúm Arakúm, on the banks of the

\* Military Statistical Review of the land of the Kirghiz-Cossacks of the Lesser Horde (*i. e.*, of the Trans-Ural Kirghiz of the Government of Orenburgh). St. Petersburg, 1848. (Page 66.)

† Selverhelm, "Military Statistical Review of the Kirghiz Steppes of Western Siberia." St. Petersburg, 1852. (Pages 29 to 41.)

‡ Materials for the Geography and Statistics of Russia, collected by officers of the General Staff. The Kirghiz Steppe, in the Government of Orenburgh by Meyer, (pp. 47 to 51). St. Petersburg, 1865.



Sir (Darya) and about the mouths of the Chúi and Sari-sú.”\* Now from the newest maps these ancient names have disappeared, either at the will of the topographers who have surveyed the localities in question, or by the order of the leaders of successive expeditions or, finally, from some mere chance or other. Without attaching, therefore, any great importance to the absence from modern maps of the names noted in the “Book of the Great Survey,” it now remains to take stock of the indications of the book itself. We are told then that into the lake Ak-Sakal-Barbi, on the side opposite the mouth of the Irgíz, several streams fall. Now if these streams and their tributaries exist at all, they are too insignificant to be taken into account. Evidently, therefore, the remark does not refer to them. But, besides these rivers and the river Irgíz, in the basin of the Ak-Sakal-Barbi there remains but one river. This is the Túrgai, and the one in all probability represented by the name Saúk. This assumption is supported by the

### ERRATA.

*Proceedings, August 1879.*

Page 224 line 26 *for* Booktoff *read* Bootkoff.

„ 226 „ 26 „ Polkoyak „ Ulkoyak.

„ 232 „ 7 „ Khvahni „ Khvalim.

far more distant, as, for example, the Juanchik (p. 208), and consequently the Túrgai must have been known under another name. Besides which, according to the testimony of Tevshin, the lake Ak-Sakal-Barbi, as compared with its size during the latter half of the last century, has considerably diminished, and therefore in former times one can imagine that the rivers were independent of each other, that the course of the Irgíz was more to the east and that of the Túrgai to the west. These arguments, therefore, seem sufficient for us to recognize in the Túrgai the ancient river Saúk. If such is the case, the river Bozin-Hinchal-Ilgén resolves itself into the Ulikoyak, a considerable tributary on the right bank of the Túrgai.

At the end of the passage in the “Book of the Great Survey” which we are now examining, a repetition of the name Irgíz is observed, with the addition to it of the word Urúk. Now it has already been said that the river Irgíz falls into the lake (Ak-Sakal-Barbi). Hence when it is observed for the second time that the Urúk Irgíz falls into the same lake, reference must be made to that Irgíz which flows from Mount Airúk; in other words to the modern Chit-Irgíz which is the same for the lower portion of

\* Histoire des Mongols et des Tatares, par Abul Gházi Bahádúr Khán, par le Baron Desmaisons. St. Petersburg, (page 191).

the large or Ulú-Irgíz. It must of course too be borne in mind that, although not mentioned, there may be another Irgíz, the name given to the upper part of the Ulú-Irgíz. "And opposite those rivers of the Khvahinski, or Caspian Sea, and in front of Mount Urúk are the sands of Arakúm and Barsúk-Kúm." In another part of the book (p. 73), it is said "And towards the Blue Sea, 280 versts from the river Irgíz, are the sands of Barsúk-Kúm, across which the distance is 25 versts, the sands of Kara-Kúm being 200 versts from the Blue Sea. The sands of Kara-Kúm are 250 versts long and 130 versts broad, and these three sands are adjacent to the shores of the Blue Sea," which of the numerous sands in the southern part of the Kirghiz Steppe is called Arakúm. Here of course there may be a slip of the pen, as in several manuscripts Arakúm is designedly called Karakúm (*vide* note 2 of the "Book of the Great Survey"). Now there are two known Karakúms in the steppes, one more to the south of the Emba, where it enters the Caspian Sea, and the other in the angle formed by the lower portion of the Sir Darya and the north-east shore of lake Aral. But if we take into consideration the testimony above produced of Abul Gházi about the existence of an Ara-Kúm independent of Karakúm, and if we note that the text of the "Book of the Great Survey" shows there are *three sands* contiguous to lake Aral, whilst it speaks only of two, *viz.*, Barsúk-Kúm and Kara-Kúm, and finally, when we really observe three separate steppes, *viz.*, the Greater Barsúk, the Lesser Barsúk and Karakúm, we are brought to believe that for the sands of Arakúm is meant either the Greater or the Lesser Barsúk, most probably the latter. And for this reason they, from their measurements, are more likely to resemble the Barsúk spoken of in the book. The Greater Barsúk is contiguous to the north-west shore of the Sea of Aral and is distant from Chit-Irgíz (250 to 300 versts). It has a width of about 25 versts. The Lesser Barsúk, or as we will call it, the Arakúm, is adjacent to the Bay of Perovski, is distant from Chit-Irgíz about 200 versts, and has a width of about 10 versts. Finally, the sands of Kara-Kúm adjoin the Bay of Sara-Cheganak and therefore the statement regarding the distance between them and the sea is not comprehensible, and probably is caused by an error in the manuscript. The sands of Kara-Kúm extend in a direct line 225 versts from north to south, that is from lake Ak-Sakal-Barbi to the natural boundary of Mailibasli on the Sir Darya, and they also stretch more than 100 versts to the eastward of the Sea of Aral. The width of the northern portion of the Kara-Kúm sands is 200 versts.

Turning then again to Mount Airúk and to the rivers which flow out of it, we read on page 69 "Out of the same Mount Urúk flows the river Hem, and into this river, on the right bank, falls the river Temirsú. The river Hem, without descending to the Caspian Sea, a distance of 20 versts,

falls into the lake." Now the river Hem, by which is meant the Emba, flows from one of its two sources from the Múgodjarski mountains, receives, as has been said, on its right bank, the waters of the Temir and at a distance of 72 versts from the Caspian Sea begins to split up into branches. At 21 versts' distance from the same sea it again passes into the same bed, and then again divides into branches, of which there are two principal ones. These having diffused their waters into lakes fall into the Caspian Sea,\* "50 versts distant from the right bank of the Hem, is the Kainyar-Sakgiz which discharges its waters into another lake. The Kainyar-Sakgiz has a course of 200 versts." The river Sagiz towards its mouth flows parallel with the Emba and at a distance from it of 70 versts, and then without reaching the Caspian Sea is lost in the salt marshes of the Tentyak-Sor, which lie at the mouth of the Emba. The length of the course of the Sagiz is 375 versts† "420 versts below the river Vor, there flow into the Yaik through its left bank three streams without name. Between them there is a distance of 70 versts. Below these streams again the river Ilez enters the Yaik" just below Túrtebi, which we call the Salt Mountain, for in it they break salt. The distance along the river Ural between the mouths of the Ori and Ilek is 360 versts. During this extent there fall into the Ural, on its left bank, not three but more rivers.‡"

*Alphabetical Index to the Geographical names in the Kirghiz Steppes and in the Country of Turkistan, which are contained in the Book of the Great Survey.—Translated from the Russian by CAPT. W. E. GOWAN, H. M.'s Indian Army.*

1. Akbashli, Akbashl, Akbalish. A lake.  
Ak-sakal-barbi or Ak-sakal-taúp, into which falls the river Irgíz.
2. Akkol. Lakes Ak-kúl, into which falls the river Jilanchik.
3. Aknúrgan. The town of Ak-kúrgan, between Turkistan and Tashkent, which does not now exist and the site of which is not known.
4. Amú-Darya, Amedariya. The right arm of the river Amú, which falls into the Sea of Aral. The Oxus. (*Vide* E. Schuyler's *Turkistan*.)
5. Ara-Kúm. The sands, probably the Lesser Barsúki, which border on the Sea of Aral.
6. The Araltova mountain. Aral-taú, probably the southern portion

\* Topographical Description of the river Emba, compiled by Sub-Lieut. Alekseyeff, of the Topographical Department, 1853. *Vide* Report of the Geographical Society, 1855. Part 15.

† Blaramberg. Page 54.

‡ Materials for the Geography and Statistics of Russia collected by Officers of the General Staff, also "the Cossack Force of the Ural." St. Petersburg, (page 36).

of the Ural range which stretch along the right bank of the river Ural to Orsk.

7. Arzas, Argas, Azar, Arzan, Arzar, Arza. The no longer existing stream between the Aral and Caspian Sea.

8. Arkan, Yarkan. A town beyond Turkistan, probably Otrar. (See Schuyler's *Turkistan*, Vol. I, page 68.)

9. Aspaga, Aspúga. One of the rivers which do not reach the river Ural, probably the Búldúrtí.

10. Barsúk Kúm. The sands of the Greater Barsúki, which border on the Sea of Aral.

11. The Great Nagai. A people dwelling in the western portion of the Kirghiz Steppes.

12. Bozin-Hinchal-Ilgen, Bozin-Hinchan-Ilgin, Bozin-Hinchal-Ilegen. A river, probably the Ulkoyak, the right branch of the Túrgai.

13. Búkbara. A town. (See Schuyler's *Turkistan*.)

14. Búzúvlúk. The river Búzúlú which falls into the Samara.

15. Vor, the river Or, which falls into the Ural at Orsk. (See Schuyler's *Turkistan*.)

16. Hem, the river Emba, which falls into the Caspian Sea. (See Schuyler's *Turkistan*.)

17. Zelenchik, Zilanchik. The river Jilanchik, which falls into Lake Ak-kúl.

18. Ilez, Izlay. The river Ilek, which falls into the Ural opposite the Iletsk settlement.

19. Iuder, Aider. A mountain and a Salt lake of the same name in the neighbourhood of the river Ural. The lake belongs to the Cossack settlements of the Ural.

20. Irgíz. The river which, after uniting with the Túrgai, falls into Lake Ak-Sakal-Barbi. (See Schuyler's *Turkistan*.)

21. Ishin. The river Ishim which falls into the Irtish.

22. Kagan. A town, probably the same as Kyat in the Khanate of Khiva.

23. Kainyar-Sakgiz. The river Sagiz (to the north of the Emba) which does not reach the Caspian Sea.

24. The Cossack Settlement (Kazáchi Goro-dok) on the island in the Ural, just above the point at which this river receives the waters of the Ilek. The history of this settlement is still an unsolved mystery.

25. Kazatski Horde. The people who call themselves Kazaks (Cossacks) but whom we call Kirghiz.

26. Kalmicks. Those who, in the 16th century, dwelt in Júngaria and the eastern portion of the Kirghiz Steppes.

27. Mount Karabas and the town of the same name on the hill. The

Tyan-Shan mountains and probably also the name given to the town of Samarkand. (See Schuyler's *Turkistan*.)

28. Karakúm, Parakúm, Arakomv, Arashka. The sands which border on the Sea of Aral and the river Sir. (See Schuyler's *Turkistan*.)

29. Karagol, Karagúl, or the Black Lakes. The lakes which form the mouths of the river Uil.

30. Mount Karachatov. The mountains of Karataú, a branch of the Tyan-Shan mountains, which stretch in a direction parallel with the course of the river Sir, and which terminate in the neighbourhood of Túlek.

31. Kenderlik, Kanderlik. Rivers which issue forth from the mountains of Ulú-Taú and which fall, the one into the river Sir, the other into the river Sari-sú. The first does not now exist and the second bears the name of Kingir.

32. Kizilbash country. Persia.

33. Kosh-Yaik. An island in the Ural above the mouth of the river Ilek. On this island there was a Cossack settlement.

34. Kúyei-Kúei. One of the rivers, probably the Kaltahaiti, which do not reach the Ural.

35. Oil. The river Uil which forms the lakes of Kara-kúl.

36. Sairyam. The town of Sairam, 20 versts to the east of Chimkent.

37. Sarsa-Súrsú. The river Sari-sú which before reaching the Sir Darya falls into Lake Telekúl.

38. Saúk. Probably the lower portion of the river Túrgai, after that river passes out of lake Sari-kop and until its confluence with the river Irgíz.

39. The Blue Sea. The Sea of Aral.

40. Sorili. Three rivers which flow out of Olú-Taú, of which the upper is probably the Ters-Ikkan which falls into the Ishim and the middle and lower the Sari and Kara Túrgai.

41. Súnak. The town of Saganak or Súnak, which lies beyond Túlek.

42. Súngúrlúk. The river, probably the Khobda, which falls into the Ilek through its left bank.

43. Sir. The river Sir Darya or Jaxartes. (See Schuyler's *Turkistan*.)

44. Tokshúr, Tashkún, Tashkúr. The town of Tashkent. (See Schuyler's *Turkistan*.)

45. Temirsú, Temir, Temerisú, Termisú, Temir. The river Temir which falls into the river Emba through its right bank.

46. Tobol, Tabol, Tabala. The river Tobol, which falls into the Irtysh. (See Schuyler's *Turkistan*.)

47. Tústebe, Túrtebe or the Salt Mountain in the Iletck settlement.
48. Turkústan. The town of Turkistan.
49. Urús, Ugús, Agús. The river Oxus of the ancients, the Amú-Darya.
50. Mount Ulútov or the Great Mountain. The mountains of Ulúr-Taú on the borders of the Túrgai and Akmolin provinces.
51. The Khvahni Sea. The Caspian Sea. (See Schuyler's *Turkistan*.)
52. Urgentch, Urgetch. The town of Urgentch in the Khanate of Khiva.
53. Urgensk, Ungersk, Ungernsk, Urgechensk, the Urgeevsk country. The country of Khiva.
54. Uruk, Urok, Urk, Oorak, Oorook, the Oorak Mountain, Airúk and commonly the Mugodjarsk mountains.
55. Urak-Irgíz. The river Chit-Irgíz taken together with the lower portion of the Ulú-Irgíz.
56. Yaik. The river Ural. (See Schuyler's *Turkistan*.)
57. Yasirvan. The town of Saúran, before coming to Turkistan.
58. Yangúrgan. The town Yani-Kúrgan between Turkistan and Tashkent which does not now exist and the site of which is not known.

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### LIBRARY.

The following additions have been made to the Library since the Meeting held in July last.

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**PROCEEDINGS**  
**OF THE**  
**ASIATIC SOCIETY OF BENGAL,**  
**FOR NOVEMBER, 1879.**

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The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th instant, at 9 o'clock P. M.

D. WALDIE, Esq., in the Chair.

The minutes of the last Meeting were read and confirmed.

The following presentations were announced—

1. From the Rev. C. H. A. Dall—"Scientific Results of the exploration of Alaska; Article IV. Report on the Limpets and Chitons of the Alaskan and Arctic Regions, by W. H. Dall."

2. From St. Xavier's College—"Observatory observations from January to June, 1879."

3. From the K. K. Akad. der Wissenschaften, München—"Ueber die Chemische Synthese," by Dr. A. Baeyer.

4. From the Director, Museo Publico de Buenos Aires—(1) "Description Physique de la République Argentine, Vol. V." by Dr. H. Burmeister. (2) "Atlas de la Description Physique de la République Argentine."

5. From the Magnetical and Meteorological Observatory at Batavia.—"Observations taken at the Observatory, Vols. II and III, from January 1869, to December, 1875."

6. From the Royal University of Norway—Several volumes of the publications of the University, the titles of which are given in the Library List.

7. From the Author—"The History of Travancore from the earliest times," by P. Shungoonny Menon.

8. From the Superintendent Marine Surveys—(1) Approaches to Cutch Mandvi. (2) Bay of Bengal, Eastern Sheet.

9. From G. V. Juggarow's Observatory, Daba Gardens, Vizagapa-

tam—"Results of Meteorological Observations, 1878, with Appendices," by A. V. Nursingrow.

10. From the Home, Revenue and Agricultural Department—(1) "Gaur; its Ruins and Inscriptions," by J. H. Ravenshaw. (2) A set of Photographs of the Paintings at Ajanta. (3) 12 Coins from the Ahin Posh Tope. (4) "The Vinayapitakam," by Dr. H. Oldenberg.

11. From the Trustees, Indian Museum—Annual Report, Lists of Accessions and selected Extracts of Minutes, April 1878 to March 1879.

12. From the Royal Society of London—"Catalogue of Scientific Papers 1864-1873, Vol. VIII."

13. From the Palæographical Society—Facsimiles of Ancient MSS., Oriental Series, Part IV.

14. From the Smithsonian Institution—(1) "Annual Report of the Board of Regents of the Smithsonian Institution for 1877." (2) "Sketch of the Life and Contributions to Science of Professor Joseph Henry, LL. D."

15. From the Trustees, British Museum—"Illustrations of Typical Specimens of *Lepidoptera Heterocera* in the collection of the British Museum, Part II," by A. G. Butler.

16. From the Author—"Premier essai sur la Genèse du Langage et le mystère Antique," by P. L. F. Philastre.

17. From F. V. Hayden, Esq., U. S. Geologist—(1) "Tenth Annual Report of the U. S. Geological and Geographical Survey of the Territories for 1876." (2) "Birds of the Colorado valley," Part I, by E. Coues.

18. From the Commissioner of Agriculture, United States—"Report of the Commissioner of Agriculture for 1877."

19. From Mrs. Charles Pickering—"The Chronological History of Plants," by Dr. Charles Pickering.

20. From Sayyid Ahmed Khan, through Dr. R. Mitra, three copper coins of Nepaul.

21. From C. J. Rodgers, Esq., some Káshmir coins.

22. From the Author—Ethnological Papers, by Dr. F. Jagor.

23. From the Author—"Hindu Tribes and Castes," Vol. II, by the Rev. M. A. Sherring.

24. From the Government N. W. P.—"Gazetteer of the Province of Oudh." (2) "A Catalogue of Sanskrit MSS. in the North-West Provinces," Part IV.

The following gentleman, duly proposed and seconded at the Council Meeting in October, was ballotted for and elected an Ordinary Member—

Dr. T. E. Charles, proposed by C. H. Tawney, Esq., seconded by Dr. D. B. Smith.

The CHAIRMAN announced to the meeting that, in accordance with Rule 7, the following gentlemen had been ballotted for and elected Ordinary Members by the Council during the recess—

D. G. Barkley, Esq., M. A., B. C. S.

R. Maconochie, Esq., C. S.

Dr. C. F. Oldham, F. R. G. S.

W. D. Blyth, Esq., C. S.

R. A. Sterndale, Esq., (re-elected), proposed by Major J. Waterhouse, seconded by Dr. J. Anderson.

The following is a candidate for ballot at the next meeting—

G. S. Leonard, Esq., proposed by Dr. R. L. Mitra, seconded by Major J. Waterhouse.

The SECRETARY announced that the following gentlemen had intimated their desire to withdraw from the Society—

C. H. Wood, Esq.

Major W. L. Samuells, B. S. C.

I. J. Whitty, Esq.

E. White, Esq., C. S.

A. Wilson, Esq.

A. Smidt, Esq.

H. S. Reid, Esq., C. S.

W. Duthoit, Esq., C. S.

and that Mr. A. C. Lyall had requested that his re-election to the Society might be cancelled.

The SECRETARY reported that the following coins had been acquired under the Treasure Trove Act—

From the Deputy Commissioner of Hoshiarpur—6 silver and 2 copper coins found in the town of Anandpur.

From the Collector of the 24-Pergunnahs—6 silver early Hindu punched coins found in digging a tank at the village of Zakra.

From the Magistrate of Budaun—7 silver coins found in the district of Budaun.

From the Bombay Branch Royal Asiatic Society—A silver coin found in the district of Sattara.

The COUNCIL reported that Mr. T. S. Isaac had tendered his resignation as Trustee of the Indian Museum on behalf of the Society and as Member of the Council, and that Dr. A. F. R. Hoernle had been appointed Trustee, and Mr. J. Westland, C. S., Member of Council, in his place.

The SECRETARY reported that the following had been made over to the Indian Museum, under the provisions of Section 12, Act XXII of 1876 :

(1) 3 small figures ; one stone, one bronze, and one copper. (2) A celt found by Capt. Badgley at Shillong in 1873. (3) Geological and other specimens collected by Lieut. Temple during the march of the Tal Chotiali Force between Kala Abdüllah Khán and Lugári Barkhán.

The SECRETARY laid before the Meeting a copy of the 1st Part of Moore and Hewitson's Descriptions of New Indian *Lepidoptera*, lately received from England, and stated that the Council had conveyed the thanks of the Society to Mr. A. Grote and Mr. Moore for the care and trouble they had taken in bringing out the work and plates.

The following papers were read :—

1. *The Evidence afforded by the Indian Pendulum Observations on the Constitution of the Earth's Crust and on Geodesy ; being an Extract from the Preface to Vol. V of the Account of the Operations of the Great Trigonometrical Survey.*—By MAJOR-GENERAL J. T. WALKER, R. E., C. B., F. R. S., &c.

The Great Meridional Arc in India, which was measured by Colonels Lambton and Everest, was long regarded as one of the most important of the several arcs which had been measured in various countries for the determination of the Figure of the Earth. But a paper by Archdeacon Pratt, which was published in the *Philosophical Transactions of the Royal Society* for 1854, shewed that the astronomical determinations of the latitudes of the stations of the Indian Arc might be very materially influenced by deflections of the plumb-line, caused by the attraction of the Himalayan Mountains, and the high Table-lands included between the mountains, and extending beyond them into Tibet. Thus a short time after the publication of this paper, Colonel Clarke, of the Ordnance Survey, while making the elaborate and very valuable investigation of the Figure of the Earth which is appended to the *Account of the Principal Triangulation of the Ordnance Survey of Great Britain and Ireland*, London, 1858, was driven to the conclusion—which is expressed in the last page of the volume—that the value of the Indian Arc had been considerably diminished since the investigations of Archdeacon Pratt.

But the several Sections of the Arc, though showing some indication of having been influenced by Himalayan attraction, did not appear to have been influenced to anything like the extent to which they should have been, considering the magnitudes of the attracting masses. Thus it was suggested, by Mr.—now Sir G. B.—Airy, that the disturbing forces must be counteracted by some compensatory disposition of the matter in the in-

terior of the earth's crust, immediately below the mountain masses. In this case pendulum observations, taken at stations on the Himalayas, and probably also on the table-lands of much lower elevation which are situated between those mountains and the sea, would show more or less diminution in the vertical force of gravity at each station (reduced to the sea-level) as compared with what would be found at stations actually situated on the sea-level. It was in order to throw light on this subject that the pendulums were employed in India, at a series of consecutive stations along the axis of the Peninsula, from Cape Comorin up to and then on the Himalayan masses, as well as at points on the coast and on islands contiguous thereto.

On making a comparison of the observed with the calculated results, we find a considerable diminution in the vibration-numbers of the pendulums—that is to say, in the force of gravity—at the Himalayan and the higher Continental stations, relatively to what is met with at the Coast and the Island stations. We may not, however, attribute this deficiency of gravity wholly to local causes, because Sir George Airy has already pointed out—many years ago, in his discussion of pendulum observations, see the *Encyclopædia Metropolitana*, Art. FIGURE OF THE EARTH—that gravity appears to be greater at oceanic stations than at continental stations, on the evidence of the vibration-numbers of pendulums which had been swung at several stations in various parts of the world, on the coasts and islands of the Atlantic and Pacific, as well as on the continents of Europe and America. Subsequently, in 1849, Professor Stokes showed\* that these differences between observation and theory might be due to a general raising of the level of the sea in the vicinity of continents, over the level at oceanic islands, because of the greater density of the continent than of the ocean. He proved that “if we set a circle of land  $\frac{1}{5}$ th of a mile high, of 1000 “miles radius, surrounding one station, against a circle of sea 3·5 miles “deep, surrounding another station, we get a difference of about 3·5, near- “ly, in the number of vibrations performed in one day by a seconds pendu- “lum.” The principal part of this correction is, however, due to the depth of sea. “Thus it would require a uniform elevation of about 2·1 miles, in “order that the land elevated above the level of the sea should produce as “much effect as is produced by the difference between a stratum of land “3·5 miles thick and an equal stratum of water.”

It is clear from Professor Stokes's investigations that whenever the results of the pendulum observations in India came to be compared with those of pendulum observations at distant oceanic stations, it was to be expected that the observed vibration-numbers might be found to be gener-

\* See his paper on the Variation of Gravity at the Surface of the Earth, in the *Transactions of the Cambridge Philosophical Society*. Volume VIII, Part V.

ally in defect, as compared with the theoretical numbers, at the Indian stations, and in excess at the Oceanic. This is what Major Herschel believes he has met with, in his preliminary investigations of the relations between the pendulum observations in India and those in other parts of the world. And it explains why in his comparison of observed with calculated results, he has referred the Indian results to the equator—instead of to the southernmost Indian station, Punnaë, as formerly—and has adopted, as a provisional basis for conversion, a mean equatorial vibration-number which he has derived from other observations than those of the Indian group.

The alteration of treatment affects the vibration-numbers throughout by a constant, the magnitude of which, however, is only 2.65 vibrations. We must look therefore to local rather than to distant causes for an explanation of the magnitudes of the deficiency of gravity which are met with.

To make this more clear it is desirable to refer the observations once more to Punnaë, instead of to the equator. Then, ranging the stations in order of altitude—from the ocean to the coast line and on to the interior of the continent, and finally up to the Himalayas—we have the following apparent variations, at all the stations but Kew, which is so far to the north of the others that it can only be compared with them on the supposition that the value of the ellipticity employed in the calculation is very exact.

#### APPARENT VARIATIONS.

| <i>Island Stations.</i> |        | <i>Inland Stations less than 2000 feet, mean 1210.</i> |        | <i>Inland Stations between 2000 and 7000 feet, mean 3822.</i> |         |
|-------------------------|--------|--------------------------------------------------------|--------|---------------------------------------------------------------|---------|
| Minicoy                 | + 4.02 | Mallapatti                                             | — 1.12 | Bangalore, South                                              | — 3.28  |
| Colába                  | + 3.40 | Pachapaliam                                            | — 1.76 | „ North                                                       | — 2.79  |
| Aden                    | + 2.34 | Nanthábád                                              | — 2.89 | Dehra                                                         | — 8.71  |
| Mean                    | + 3.25 | Kodangal                                               | — 1.94 | Mussoorie                                                     | — 5.57  |
|                         |        | Damargída                                              | — 3.91 | Mean                                                          | — 5.09  |
|                         |        | Somtána                                                | — 1.66 |                                                               |         |
| <i>Coast Stations.</i>  |        | Badgaon                                                | — 1.38 |                                                               |         |
| Punnæ                   | 0.00   | Ahmadpúr                                               | — 1.73 |                                                               |         |
| Kúdankolam              | + 0.09 | Kaliánpúr                                              | — 0.96 |                                                               |         |
| Alleppy                 | + 1.44 | Pahárgarh                                              | — 2.95 | <i>Himalayan Table-land Station 15,400 feet high.</i>         |         |
| Mangalore               | — 0.59 | Usira                                                  | — 0.95 |                                                               |         |
| Madras                  | — 0.74 | Datairi                                                | — 1.65 |                                                               |         |
| Cocanáda                | + 0.84 | Kaliána                                                | — 3.49 | Moré                                                          | — 21.44 |
| Calcutta                | + 1.38 | Nojli                                                  | — 4.23 |                                                               |         |
| Ismailia                | — 0.48 | Meean Meer                                             | — 3.36 |                                                               |         |
| Mean                    | + 0.24 | Mean                                                   | — 2.27 |                                                               |         |

These figures show a comparative excess of gravity at the Island stations which is equivalent to 3.25 vibrations of a seconds pendulum, and which diminishes to an excess of 0.24 at the Coast stations, and becomes a defect of 2.27 at Inland stations under 2000 feet in height, of 5.09 at Inland stations between 2000 and 7000 feet, and of 21.44 at Moré, where the height is 15,400 feet. It will be found that the ratios of the mean defects of the vibration-numbers to the average heights of the elevated masses, as exhibited at the two groups of Inland stations and at Moré, are very fairly accordant, a change of one vibration accompanying changes of height of 533, 751 and 718 feet respectively. And if we multiply the mean of these values by 3.25—the mean excess at the three Island stations—we get 2,168 feet, which probably does not differ very materially from the mean depression of the circumjacent ocean-bed below the level of the islands. Thus the amount of elevation above or depression below the actual sea-level has obviously a very important bearing on the discrepancies between theory and observation.

Now it is to be remembered that the vibration-numbers at the Island and Coast stations have not, in a single instance, been increased for the deficiency of density of the sea as compared with the land; because satisfactory data of the surrounding sea-depths were not available. It will, however, be obvious that in order to institute a fair comparison between the force of gravity at these and at the inland stations, the vibration-numbers at the coast stations should be somewhat augmented, and those at the island stations should be augmented in a still greater degree, on this account. Moreover the vibration-numbers at the higher inland stations should also be increased, not on account of the density of the sea, but because the observations have been reduced to the apparent sea-level, which is presumably raised above the normal sea-level by the attraction of the continental masses. The extreme increase would be at Minicoy Island, for deficient density, on the one hand, and at Moré, for elevation, on the other. For Minicoy we may take the increase as from 3 to 4 vibrations. For Moré, if we assume the apparent sea-level to have been raised 1000 feet by Himalayan attraction,\* we get an increase for height and mass of 2 to 3 vibra-

\* In the 4th edition of his *Figure of the Earth* (1871), Archdeacon Pratt shows (Arts. 200 and 201) that if  $z$  is the height through which the sea-level immediately below a station on a table-land is raised by attraction,  $h$  the height of the table-land,  $d$  the length of the mean horizontal diameter of the table-land through the station, and  $c$  the earth's radius, then

$$z = \frac{3}{8} \frac{hd}{c}, \text{ approximately,}$$

and taking  $h = 15,500$  feet,  $d = 670$  miles and  $c = 3,956$  miles  
he gets  $z = 985$  feet.



tions, by Dr. Young's rule. Thus the ratio of gravity at the extreme stations of Minicoy and Moré would not be very sensibly altered from what the given vibration-numbers indicate; but the increase in the vibration-number would gradually diminish in passing from either of the two extreme stations to any intermediate inland station, which is situated too far from the sea to be influenced by its density, and on land too low to raise the sea-level sensibly; consequently the ratio of gravity at the central as compared with the extreme stations may be very sensibly affected, that is to say by the amount due to an alteration of 2 to 4 vibrations at one or other of a pair of stations under comparison.

Still, however, making every allowance for these causes, the broad fact remains that the observations at the Indian pendulum stations exhibit a marked increase of gravity, when we proceed from the interior of the continent to the coast and then to the islands of the ocean; and they also indicate a very marked decrease, when we proceed towards and ascend the high table-lands of the Himalayas. These facts point to a condensation of the matter of the earth's crust under ocean-beds, and an attenuation of the matter under mountain-beds, the crust contracting and condensing wherever it sank into hollows, and expanding and attenuating wherever it rose into continents, as has been suggested by Archdeacon Pratt.

This seems a fitting place for giving a brief sketch of the Archdeacon's labours and investigations, on the subject of the effects of Himalayan Attraction upon the Geodetic Operations of the Great Trigonometrical Survey of India.

The question was first brought to his attention, in 1852, by the then Surveyor General, Sir Andrew Waugh. Discrepancies of  $5''\cdot2$  and  $3''\cdot8$  respectively had been met with between the computed and observed amplitudes, in the two northernmost sections of the Great Arc, Damargída-Kaliánpúr-Kaliána, the observed value being in defect in the northern and in excess in the southern section. They were supposed to be due to the influence of the great mountain range to the north, though distant fully sixty miles from Kaliána, the nearest of the three stations. Archdeacon Pratt set himself to calculate the actual amount of the attraction of the Himalayan mass, and of the deflection on the plumb-line which it would cause at the three stations. The result obtained was very much larger than had been expected, or than was required to explain the differences between the astronomical and the geodetic amplitudes. The Archdeacon's calculations were communicated to the Royal Society, in the paper already alluded to which was published in the *Philosophical Transactions* for 1854. This paper is followed by one by G. B. Airy, Esq., Astronomer Royal, suggest-



ing that the effect of the mountains may be counteracted by their bases having sunk to some depth into the dense fluid lava below, on the surface of which the crust may usually be supposed to repose ; such sinking would cause a displacement of dense by lighter matter below, which would tend to compensate for the excess of matter above. While demurring to the form of this suggestion, Archdeacon Pratt followed up the idea, and reduced to calculation another hypothesis regarding deficiency of matter below mountains, *viz.*, that the irregularities of the mountain surface have arisen from the expansion of the earth's crust upwards, from depths below, which has upheaved the mountains and produced a slight but extensive attenuation of the mass below them. This attenuation he shows to be sufficient to produce a considerable amount of compensation for mountain attraction ; but he states that it does not clear up the difficulties ; and, being a mere hypothesis, nothing certain could be determined regarding it ; see No. XXIX of *Philosophical Transactions* for 1858. Subsequently he investigated the influence of the Ocean on the plumb-line in India, and found that it also had a very sensible effect at the stations of the Arc, and in the same direction as the Himalayan Attraction (No. XXX, *Philosophical Transactions*, 1858).

Hitherto the Archdeacon had been inclined to attribute the calculated deflections of the plumb-line, in some degree, to errors in the elements of the figure of the earth which had been employed in the geodetic computations. But in 1860 he satisfied himself that this was not the case, and that there *are* hidden causes,—in variation of density in the crust below the Indian Arc—which, taken in combination with the Mountain and Ocean Attraction, explain the smallness of the discrepancies that had been met with, (No. XXXIV, *Philosophical Transactions*, 1861).

Thus far his attention had been directed only to horizontal attractions, producing, and measured by, deflections of the plumb-line. When the Indian pendulum operations were commenced, he watched their progress with great interest, to see whether their direct measures of vertical attraction supported his views regarding attenuation of matter below mountains. The results of his calculations are given in his *Figure of the Earth*, 4th edition, 1871. He shows, in Art. 196, that the discrepancies between theory and observation become considerably reduced when it is assumed that beneath any portion or cap of the earth's crust, which is raised above the sea-level, there is a uniform attenuation of matter equal to that of the cap, running down to a depth from fifty to one hundred times the thickness of the cap. This result was arrived at when as yet he had only been furnished with the evidence of the stations between Minicoy and Kaliána, the highest of which is only about 3000 feet above the sea-level. Subsequent-

ly, while passing the proof-sheets of the volume through the press, he learnt the result of Captain Basevi's observations at Moré; he then made a calculation which showed that an assumed attenuation of matter equal to that of the Moré plateau, and extending to a depth equal to fifty times the height of the plateau, would, if taken account of in the reductions, leave so small a difference between theory and observation as to bear strong testimony to the truth of his hypothesis, see Art. 201.

Archdeacon Pratt died before this edition of his *Figure of the Earth* was published. His views have since received further confirmation by the measurement of two longitudinal arcs across the Southern Peninsula of India, from Madras to Mangalore, and from Vizagapatam to Bombay. The terminal stations of these arcs being situated on the coast line, in each instance, it was probable that at each station the plumb-line would be deflected inland, because of the greater attraction of the land than the sea, in which case the astronomical amplitudes would have been greater than the geodetic. Actually, however, the converse was found to have happened, for the astronomical amplitudes proved to be less than the geodetic; this showed that the plumb-line had been deflected towards the sea, presumably because of denser matter under the bed of the ocean than under the land.

An additional support to the Archdeacon's hypothesis has been recently furnished by an interesting calculation in Colonel Clarke's latest investigation of the Figure of the Earth, published in the *Philosophical Magazine* for August, 1878. Colonel Clarke has computed the departure (in a vertical plane) of the curve which best represents the Indian meridian, on the evidence of the geodetic observations in India, from the curve which best represents the earth as a whole, on the evidence of the geodetic observations in all other parts of the world as well as India. He shows that the curves cross each other, and that their departure in no case exceeds 20 feet; and he says—"This deformation may or may not be due to Himalayan attraction; at any rate we have here an indication that that vast table-land does not produce the disturbance that might *à priori* have been anticipated. This is in accordance with the fact that there is an attraction *sea-wards* at Mangalore and Madras, and slightly also at Bombay: and I think we have here a corroboration of Archdeacon Pratt's theory, that where the crust of the earth is thickest there it is least dense; and where thinnest, as in ocean-beds, there it is most dense."

If the hypothesis of sub-continental attenuation and sub-oceanic condensation is a true one, and is in accordance with the actual facts of the constitution of the earth's crust, then it follows that there can be no very

considerable disturbance of the sea-level, so that all radii drawn from the centre of the earth to the surface of the ocean will be sensibly equal—assuming the figure to be exactly spherical in order to avoid circumlocution; it also follows that deflections of the plumb-line are not likely to be very considerable, excepting in the immediate vicinity of mountain masses, where the deficiency below cannot neutralise the excess above. If so, then distant mountain masses may cease to be regarded as prejudicial to geodetic operations, for their influence will be sufficiently counteracted by other causes; the resultant effect at a distance may even be materially less than that of local and contiguous irregularities in the configuration of the ground, the magnitudes of which may be insignificant as compared with those of the mountain and continental masses. In like manner the deficiency of ocean-density need not be regarded as liable to influence distant geodetic operations, as it may be expected to be neutralised by an increase of density in the crust below the ocean-bed.

On the other hand, if the hypothesis is not correct, we are driven to conclude that the radii of the (spherical) earth are of unequal length, and that there must be considerable variations between the apparent level of the sea and the normal level which corresponds to the curve of equal radii. In this case the actual irregularities of the surface of the earth will be much greater than they appear to be, and the greater will be the departure of the Actual Figure from a simple geometrical figure, such as the Mean Figure—either a spheroid of two axes, or a triaxial ellipsoid—which geodesists deduce from their measurements over the earth's surface.

This latter view of the subject has found a warm advocate in Germany, in the person of Dr. J. Hann, who urges—in a paper published in Vienna, in the *Mittheilungen der Geographische Gesellschaft*, 1875, No. 12,—that the sea-level is greatly distorted, because of the unequal distribution of matter on the earth's surface; consequently, that we can no longer hope that geodetic measurements, reduced to a sea-level thus distorted, will conform to a regular ellipsoid of revolution; that our knowledge of the true form of the earth is deficient; and that it has become desirable to resort to pendulum operations, in order to determine the variation of gravity—as against some normal station—at as many oceanic islands as possible, and also at numerous stations on the coasts and in the interior of the great continents, in order to discover, by the shortest method, the irregularities of the sea-level.

Measurements of the variations of gravity have, unquestionably, one great advantage over measurements of meridional and longitudinal arcs, in that they can be conducted with far greater rapidity and at a far smaller cost. But they are open to a grave objection, in that when reducing them

to the sea-level, in order to obtain results from observations at different stations which will be strictly comparable with each other, it is necessarily assumed that the matter of the whole of that portion of the earth's crust which lies *directly* below the sea-level—and which, from its proximity, materially influences the attraction at the sea-level—is of uniform density throughout, in all parts of the world, whether situated underneath mountains and continents, or underneath the bed of the ocean. On this hypothesis all pendulum observations have hitherto been reduced to a common level, and it is none the less an hypothesis that it has been made tacitly. It implies that the matter of the visible masses above the sea-level is wholly unconnected with, and independent of, the matter of the invisible masses below; thus the mountains and continents might consist of just so much stuff thrown off passing meteors and asteroids—having a density  $\sigma = \frac{1}{2} \rho$  the mean density of the earth,—instead of being a continuation, or an expansion, of the matter immediately below them, which is the more natural supposition. That there actually is any such severance of continuity and disconnection between the visible above and the invisible below, appears, on the face of it, to be highly improbable.

Seeing then that, do what we will, we must make some assumption, I cannot but think that Archdeacon Pratt's hypothesis that the visible masses above may be regarded as so much matter abstracted from the invisible masses below, is the least difficult of the two hypotheses to accept. And if we proceed to consider the constitution of the crust below the bed of the ocean, it appears to me to be easier to assume, with the Archdeacon, that there the matter has been condensed down to a depth which bears some relation to the depth of the ocean above, than to assume it to be of the same density as the comparatively uncontracted matter at the level of the sea, on the coast lines.

Data are available for estimating, with tolerable approximation, the relative magnitudes of the greatest horizontal attraction exerted by the Himalayas and the greatest vertical diminution of attraction under the Himalayas, that is to say, of the two forces by which the geodetic and the pendulum operations, in India, are respectively most influenced. The latitude of one of the trigonometrical stations in Dehra Dún—beyond the northern extremity of the Great Arc—has been determined, both astronomically, and by calculation through the triangulation from Kaliánpúr, the astronomical origin of latitudes, 428 miles to the south. Dehra Dún being at the foot of the Himalayas, a large deflection of the plumb-line must be expected there, and, in fact, a larger meridional deflection has been met with there, than at any other station of the Survey at which astronomical observations have been taken. The astronomical latitude at Dehra is  $37^{\circ} 6'$  in defect of

the geodetic latitude, computed, from Kaliánpúr, with the constants for the figure of the earth which are employed in all the geodetic calculations of this Survey; the difference would be diminished by  $1''.4$ , if Colonel Clarke's constants of 1866 had been employed instead. The astronomical azimuth at Dehra is  $12''.2$  in defect of the geodetic azimuth, also computed from Kaliánpúr; consequently, as the latitude is  $30^\circ 19' 57''$ , the deflection on the prime vertical—being equal to the azimuthal error  $\times$  the cotangent of the latitude—may be taken as  $20''.8$ . The resultant of the two deflections is  $43''$ ; it may be either increased or diminished by the local attraction at Kaliánpúr, which, however, is almost certainly not large. Assume the total deflection to be  $43''$ ; then the horizontal attraction which would produce a deflection to that extent is equal to gravity  $\times$  tangent of the deflection  $= .0002 g$ . Now we have seen that at Moré the deficiency of vertical attraction diminishes the number of vibrations of a seconds pendulum by about 21 vibrations *per diem*; and this deficiency of force is equivalent to  $.0005 g$ . Hence it appears that the variations of attraction which arise from hidden causes, below the Himalayan Mountains, may be from two to three times as great as those which arise from the mountains themselves; this being the proportion of the maximum vertical deficiency which has yet been met with, to the maximum horizontal attraction which has yet been met with.

Thus the Pendulum Observations in India have furnished much evidence in confirmation of the accuracy of the Geodetic Operations in India, tending to show that the latter have not been influenced, either by the positive attraction of the Himalayas, or by the negative attraction of the Ocean, to anything like the extent which each disturbing element, acting alone, would produce, were it not neutralised by the interior constitution of the subjacent matter.

It would seem that measures of variations of gravity on the earth's surface can never be made to supersede direct measures of the earth's figure. Each process is supplemental to the other; for all determinations of variations of gravity, in widely separated localities, necessarily rest on an exact knowledge of the figure; and a knowledge of the variations of gravity gives greater exactitude to the determination of the figure. Thus there is no necessity to divorce the two processes, and to relegate either the one or the other into obscurity; on the contrary, the simultaneous employment of both, whenever practicable, appears to be most desirable, in the general interests of Science.

2. *On a simple method of using an insignificant Fraction of the Main Current, produced by a Dynamo-Electric Machine for Telegraph purposes.*—By LOUIS SCHWENDLER, M. I. C. E. &c., &c.

(Abstract.)

The author pointed out that up to the present the electric currents required for Telegraph signalling were chiefly produced by galvanic Batteries, a method comparatively expensive and also connected with cumbersome arrangements. Since his Electric light experiments, instituted last year in London by order of the Secretary of State for India, he had always been of opinion that it would be of technical as well as of economical importance if the strong, constant and exceedingly cheap currents, produced by the present construction of Dynamo-Electric machines, could be made available for signalling purposes. However Mr. Schwendler found at the time, that there were some difficulties in the way, which he believed he had now overcome ; and having of late made some experiments on the subject, he did not hesitate to communicate the results. His method is a very simple and ingenious one. A strong current is produced through a comparatively small resistance by a Dynamo-Electric machine, which is an arrangement for converting *Mechanical Power* direct into *Magnetism* and *Electricity* according to the well known laws of Faraday's Magneto-Induction. This strong main current, so produced, is made use of for doing any kind of *useful* work. For instance, during night the useful work done by the main current may be given out as a powerful Electric Light to illuminate the signalling office ; or during day-time the strong main current may be employed to drive an Electro-Magnetic Engine which, in its turn, is used for doing any kind of useful mechanical work, as pulling the punkhas, producing a draft of refreshing cool air through the building, lifting messages, &c. &c. ; or the main current may be sent through a large galvanoplastic apparatus in use, say, at the Surveyor General's Office &c., &c. Thus a strong electric current becomes available, the production of which is wholly or partly repaid by the useful work it is able to execute in a variety of ways as indicated.

On the other hand the electric currents required for signalling purposes are exceedingly weak as compared with the strong main current. Hence the Electric currents may be supplied to the Telegraph lines, by simply tapping the main current without perceptibly reducing it, or without influencing the useful work done by the main current. This is the method Mr. Schwendler proposes. He said : " This might be an inducement for Telegraph administrations to come forward more quickly with the introduction of the Electric Light in their Signalling offices, since they would



get the signalling currents for all the lines terminating in an office into the bargain, and the costly and cumbersome galvanic apparatus might be dispensed with."

On the 14th October, 1879, Mr. Schwendler telegraphed by this method to Agra. The main current was produced at the Alipore Government Telegraph Workshops, and the useful work consisted of a powerful Electric Light, illuminating the Workshops perfectly. An ordinary Telegraph line conveyed the branch current to the Calcutta Signalling Office, where it was joined to the Agra line (850 miles in length); and several messages were despatched by the use of this current. No alteration of the electric light could be observed when telegraphing; and this, of course, is quite right, since the signalling current tapped off was scarcely 0·04 per cent. of the main current producing the light.

Other experiments equally successful were made. In fact, feeding in this manner all the 14 lines which terminate at the Calcutta Office, scarcely more than 5·0 per cent. of the total main current is required.

Mr. Schwendler concluded by saying that there was little doubt left that, at no distant future, Telegraph lines would be supplied with currents produced by Dynamo-Electric machines instead of using galvanic currents as hitherto.

The paper will be published in full in the Journal, Part II.

3. *Notes on the Survey Operations in Afghánistán during the Campaign of 1878-79; compiled, from Letters and Diaries of the Survey Officers, by MAJOR J. WATERHOUSE. Communicated by MAJOR-GENL. J. T. WALKER, B. E., C. B., F. R. S.*

(Abstract.)

This paper gives an account of the work performed by the Survey parties attached to the Quetta, Kuram and Pesháwar Columns of the Afghán Expeditionary Force in 1878-79, and will be published, with a map, in the forthcoming number of Part II of the Journal.

4. *On the Systematic Position of some little-known Asiatic Mantodea, with Descriptions of two new Species belonging to the Genus Hestias. By J. WOOD-MASON.*

(Abstract.)

Genus *HESTIAS*, Saussure.

The genus *Hestias*, proposed in 1871 by De Saussure for the reception of a remarkable insect from Sylhet, is referred to the subfamily *Harpagidae*, wherein it must take its place next after, or in the immediate neighbourhood of, *Acromantis* and its allies, from which it is readily distin-

guishable by the form of the prothorax, by the structure, and by the peculiar style of colouring of the insides, of the fore legs, &c. The author recognises five species, of which two are now for the first time described, viz. :—

1. *HESTIAS BRUNNERIANA*, Saussure, Mél. Orthopt. i, 1871, 3me fasc., p. 454, ♀.—Wood-Mason, P. A. S. B. August 1876, ♂ ♀.

*Hab.* Sylhet and Calcutta in N. India and Mysore in S. India.

2. *HESTIAS ROGENHOFERI*.

*Pachymantis Rogenhoferi*, Saussure, Mél. Orthopt. ii, 1872, p. 77, pl. ix, fig. 27 ♀.

*Hab.* Moluccas?

3. *HESTIAS PICTIPES*, n. sp.

♂ ♀. Head with a minute horn shaped like that of *H. Brunneriana*.  
♂. Organs of flight ♀ not reaching, ♂ extending beyond, extremity of abdomen. Tegmina ♀ with the marginal field opaque light yellowish green, the rest delicately hyaline; wings with marginal field subopaque orange-yellow, the venation of the rest of the organ of the same colour narrowly lined with hyaline, and the meshes pale smoky. Fore coxae red-violet especially internally, femora inside on the lower half jet-black with three distinct white spots in a longitudinal row, and with a narrow black stripe extending from the base along fully three-fourths of the length of the margin of the foliaceous expansion, the rest of the surface being rich red-violet.

Length ♀ about 19 millims, ♂ 17.

The specimen of the male is somewhat bleached from long residence in spirit.

*Hab.* ♀ Marble Rocks, near Jabalpur in the Central Provinces of India; ♂, precise locality unknown.

4. *HESTIAS INERMIS*, n. sp.

♀. Head without a vestige of a horn, with the postocular tubercles by correlation reduced to low smooth and rounded elevations; behind the ocelli longitudinally deeply 4-sulcate. Organs of flight not reaching extremity of body; tegmina with the light opaque umber-brown marginal field pubescent; and with the posterior field rich dark umber-brown mottled in places with lighter and with hyaline, and crossed beyond the middle by a band half hyaline and half opaque cream-coloured; wings opaque lemon-yellow very broadly margined with dark brown, with the transverse veinlets lined with hyaline.

Fore coxae jet-black inside, femora jet-black at base, whence this colour is continued for some distance as a marginal band on to the foliaceous expansion.

Length about 34 millims.



*Hab.* Nága Hills (Captain J. Butler). Very nearly allied to the following.

5. *HESTIAS PHYLLOPUS*.

*Mantis (Oxypilus) phyllopus*, De Haan, Bijd. etc., p. 84, pl. XVI, fig. 7, ♂.

The fore femora ♂ ♀ have two black stripes in the lower half (primitive femur).

The author has seen a specimen of the female either at Oxford or in the British Museum.

*Hab.* Java.

Genus *OXYPIUS*, Serville.

The author considers that this genus should be transferred from the *Mantidae* to the *Harpagidae* and therein placed between the genera *Hestias* and *Sigerpes*. *Ceratomantis Saussurii*, W.-M., and *Mantis (Oxypilus) bicingulata*, De Haan, are shown to be closely allied Asiatic species of it, having the same relation to one another, as regards degree of development of the cephalic horn, as have *Hestias Brunneriana* and *Hestias pictipes*. *Oxypilus* has in common with *Sigerpes* the two posterior ocelli placed at the bases of spines. The author has only been able to study immature specimens of one African species, and if the perfect winged insects of these should hereafter be found to differ sufficiently from those of the Asiatic species to warrant their separation from them generically, the latter must take the name of *Pachymantis* proposed for the reception of De Haan's *Mantis bicingulata* by De Saussure.

This paper will be published in *extenso* in the Journal, Part II, No. 4, for the current year, with figures of anatomical details.

5. *Description of Sigerpes occidentalis, the Type of a new Genus of Mantodea from West Africa.—By J. WOOD-MASON.*  
(Abstract.)

In this short paper a new species of *Mantodea* closely related to the East African *Sibylla tridens*, Saussure, is described and made the type of a new genus, *Sigerpes*, which must be placed in the subfamily *Harpagidae* next to the genera *Oxypilus* and *Hestias*.

The cephalic horn, as was suspected by the author (P. A. S. B., 1876), turns out to be rudimentary in the males.

The new species, described from a fine dried ♀ specimen in the British Museum from the neighbourhood of Sierra Leone, differs from *Sigerpes* (olim *Sibylla*) *tridens* ♀ in having the cephalic horn somewhat longer and without lateral lobes and teeth, the base of the wings greenish yellow, the fore tibiae more numerously toothed, the fore femora on the inside red tipped with black, and the extremities of the organs of flight not so obviously truncate.

This paper will be published in the Journal, Part II, No. 4, for 1879.

## LIBRARY.

The following additions have been made to the Library since the Meeting held in August last.

TRANSACTIONS, PROCEEDINGS AND JOURNALS,  
*presented by the respective Societies or Editors.*

Batavia. *Natuurkundig Tijdschrift voor Nederlandsch - Indië*,—Deel XXXVIII.

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May. *Rammelsberg*.—Ueber die Fortschritte in der Kenntniss der chemischen Natur der Meteoriten.

June. *Weber*.—Ueber die Magavyakti des Krishnadāsa Miqra.

Bombay. *Indian Antiquary*,—Vol. VIII, Parts 96, 97 and 98.

No. 96. *Williams, Monier*.—Notes on Indian Folklore &c. *Fleet, J. F.*—Sanskrit and old Canarese Inscriptions, No. 54. *Cain, Rev. John*.—The Bhadrachellam and Rekapalli Taluqas. *Müller, Dr. E.*—Report on the Inscriptions in the Hambantota District, Ceylon. *Simpson, W.*—Buddhist Remains in the Jalâlâbâd Valley.

No. 97. *Fleet, J. F.*—Sanskrit and old Canarese Inscriptions, Nos. 55 and 56. *Raghunâthji, K.*—Marâthi Schools and School-Masters. *Cowell, Prof. E. B.*—The Northern Buddhist Legend of Avalokiteswara's Descent into the Hell Avîchi. *Beal, Rev. S.*—The Story of the Faithful Deer.

No. 98. *Thomas, E.*—On some Bilingual Coins of Bokhârâ, struck in the second century of the Hijra—Continuative of Sassanian Types and Devices. *Foulke, Rev. T.*—Grant of Nandivarmâ-Pallavamalla. *Fleet, J. F.*—Sanskrit and old Canarese Inscriptions, Nos. 57-59. *Grierson, G. A.*—A Further Folklore Parallel. *Badley, Rev. B. H.*—Jagjivandâs, the Hindu Reformer.

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No. 2. *Moutard-Martin, R.* and *Richet, Ch.*—Des causes de la mort par les injections intra-veineuses de lait et de sucre.

No. 3. *Villarceaux, Y.*—Théorie du pendule simple, à oscillations coniques, en ayant égard à la rotation de la terre. *Denza, P. F.*—Sur les lois des variations de l'électricité atmosphérique, déduites des observations régulières faites à l'observatoire de Moncalieri.

No. 4. *Lechartier, G.*—Sur le dosage des matières organiques des eaux naturelles.

No. 5. *Faye.*—Sur le dernier tornado des Etats-Unis, et sur les anciennes observations de trombes dues à Buffon et à Spallanzani. *Colladon.*—Origines de la grêle et constatation de trombes où l'air est aspiré de bas en haut.

No. 6. *Daubrée.*—Recherches expérimentales sur l'action érosive des gaz très comprimés et fortement échauffés; application à l'histoire des météorites et des bolides.

No. 8. *Wurtz*, and *Bouchut.*—Sur le ferment digestif du *Carica papaya*.

No. 9. *Janssen, J.*—Note sur les températures solaires.

No. 11. *Pellet, H.*—Dosage de l'azote organique dans les eaux naturelles.

No. 12. *Naudin, C.*—Influence de l'électricité atmosphérique sur la croissance, la floraison et la fructification des plantes.

No. 13. *Déville, H. St. Claire* and *Mascart.*—Construction de la règle géodésique internationale et détermination de ses poids de contrôle. *Gosselin* and *Bergeron, A.*—E'tudes sur les effets et le mode d'action des substances employées dans les pansements antiseptiques. *Couty* and *de Lacerda.*—Sur un nouveau curare, extrait d'une seule plante, le *Strychnos triplinervia*.

No. 14. *Gosselin* and *Bergeron, A.*—E'tudes sur les effets et le mode d'action des substances employées dans les pansements antiseptiques.

———. *Revue Critique*.—Vol. VIII, Nos. 28—41.

No. 33. *Darmesteter, J.*—Haug. Essais sur la langue sacrée, la littérature et la religion des Parsis.

No. 39. *Fagnan, E.*—Bacher. Aphorismes et épigrammes de Sa'di, texte et traduction.

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———. *Revue Scientifique*,—Vol. XVII, Nos. 3—15.

No. 5. La Chine dans l'Asie Centrale.

No. 14. Les Anglais dans l'Afghanistan.

No. 15. *Imbs, J.*—La Soie, ses dérivés, ses similaires.

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PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,
FOR DECEMBER, 1879.

The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 3rd instant, at 9 o'clock P. M.

H. B. MEDLICOTT, Esq., M. A., F. R. S., President, in the Chair.

The minutes of the last Meeting were read and confirmed:—

The following presentations were announced—

1. From the Home, Revenue and Agricultural Department,—(1) The Fishes of India, Vol. II, by F. Day; (2) Scientific Results of the Second Yarkand Expedition. *Mammalia*, by W. T. Blanford.

2. From the Author,—(1) On the connection of the Móns of Pegu with the Koles of Central India; and (2) On Tibeto-Burman Languages, by Captain C. J. F. Forbes.

3. From the K. K. Geol. Reichsanstalt of Vienna,—Die Gasteropoden der Meeres-Ablagerungen der ersten und zweiten Miocänen Mediteranstufe in der österreichisch-ungarischen Monarchie. I Conus, by R. Hoernes and M. Auinger.

4. From T. E. Henry, Esq.,—Aeneidea or Critical, Exegetical and Æsthetical Remarks on the Aeneis, Vol. II, by J. Henry

5. From Col. J. F. Tennant,—Researches on the motion of the Moon, —Part I, by Professor Simon Newcomb.

The following gentleman, duly proposed and seconded at the last Meeting, was ballotted for and elected an Ordinary Member—

G. S. Leonard, Esq.

The following are candidates for ballot at the next meeting—

1. Fred. E. Pargiter, Esq., B. A., C. S., proposed by H. Beverley, Esq., seconded by J. Crawford, Esq.

2. Bábu Govinda Kumara Chaudhuri (re-election), proposed by Babu Pratápa Ch. Ghosha ; seconded by Dr. Rájendralála Mitra.

3. Lieut. W. H. Johnstone, R. E., proposed by Col. J. F. Tennant, seconded by Major J. Waterhouse.

4. H. Kisch, Esq., c. s., proposed by J. Crawford, Esq., seconded by Major J. Waterhouse.

5. J. W. Parry, Esq., proposed by Carr-Stephen, Esq., seconded by Major J. Waterhouse.

The SECRETARY reported that Major W. R. M. Holroyd had intimated his desire to withdraw from the Society.

The COUNCIL reported that they had elected Mr. H. B. Medlicott, M. A., F. R. S., President of the Society in place of Mr. W. T. Blanford, Messrs. C. H. Tawney and J. Westland, Vice-Presidents in place of Messrs. Isaac and Medlicott, and Mr. J. Crawford, Member of Council in place of Dr. J. Anderson who was about to leave for Europe. Mr. Crawford would also act as General Secretary on the departure of Major Waterhouse.

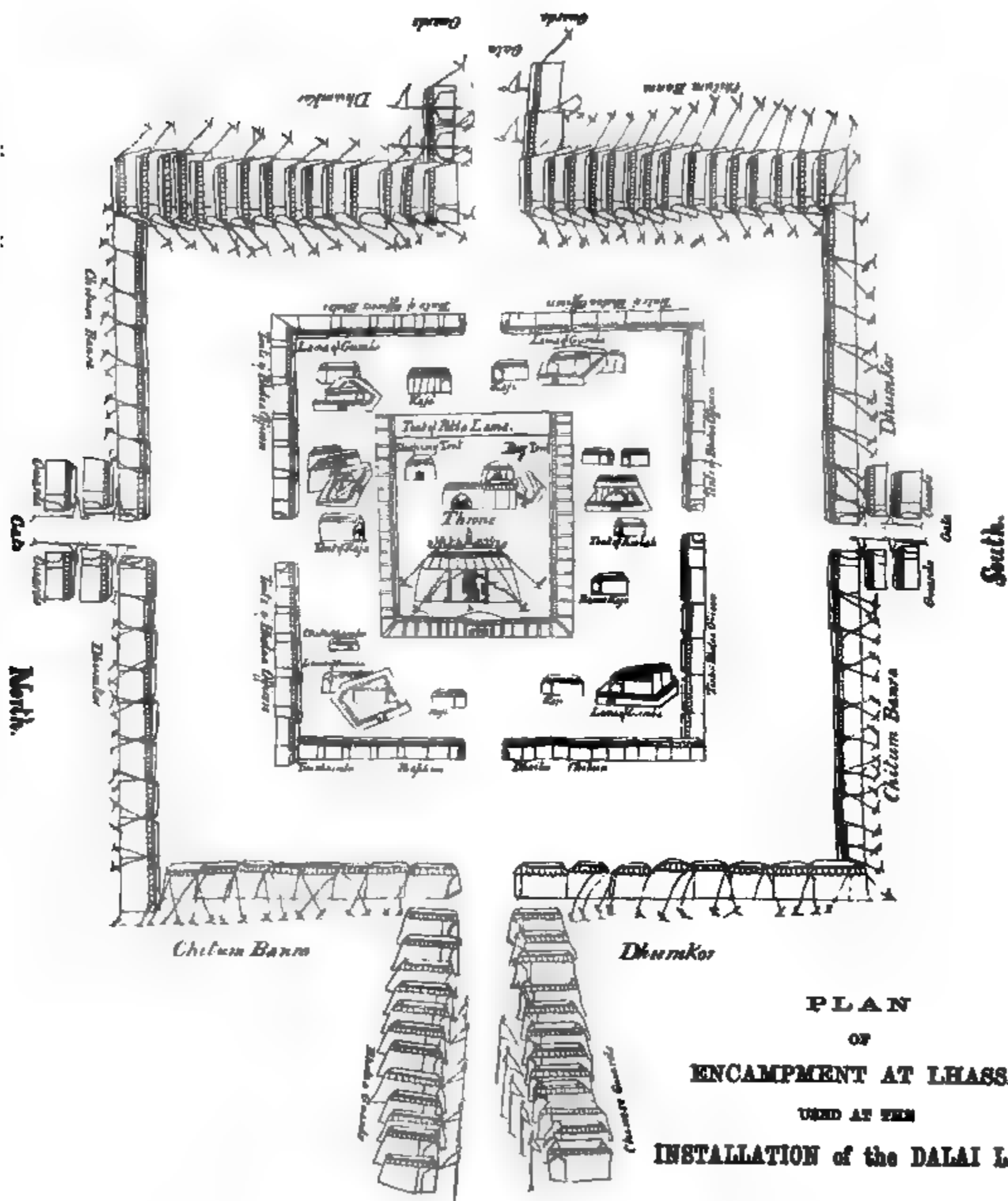
Mr. MEDLICOTT said he had a few words to say upon the announcement that had just been made from the proceedings of the Council ; first, to express the regret of the Council and, he had no doubt, of the Society at large, at losing the services of Major Waterhouse, who has for seven years and a half so efficiently fulfilled the duties of Honorary Secretary. At the same time the Society was to be congratulated upon securing so competent a successor as Mr. Crawford.

Next as to the nomination of himself as President, owing to the resignation of Mr. William Blanford on the occasion of his leaving India : as his successor he felt how unfit he was to undertake the duties of spokesman. He could only accept the post with a claim upon the indulgence of the Society, and because more suitable men had declined to be brought forward.

Furthermore, he had the honor to propose to the members who were present to pass a vote of thanks on the part of the Society to Major Waterhouse on his retiring from the office of Honorary Secretary.

MAJOR WATERHOUSE said, he begged to thank the members present for the vote they had just passed. He was afraid he had not done so much for the Society as he could have wished, but he had tried to do as much as he could in the limited time at his disposal. The work had been a great pleasure to him and, though he feared he would be unable to take the Honorary Secretaryship again on his return from England, he should be very glad if he could be of any further use to the Society.

Est.



Photoreographed at the Surveyor General's Office

West

The SECRETARY reported that the following coins had been acquired under the Treasure Trove Act.

From the Huzur Deputy Collector of Shikarpúr,—One Bakhri Rupee found buried in a Muhammadan cemetery near Ratladera.

From the Bombay Branch Royal Asiatic Society,—(1) A silver coin from the Collector of Surat; and (2) A Gadhia Coin from the Collector of Nassick.

The SECRETARY read the following letter from C. Girdlestone, Esq., forwarding a plan of the encampment lately used at the installation of the Dalai Lama together with an extract from the Report of the Vakeel at Lhasa to the Durbar on the subject.

“In case the members of the Asiatic Society like to see it I send under separate cover the plan of the encampment lately used at the installation of the present Dalai Lama. I agree with the late Mr. Heeley (Article on Tibet, *Calcutta Review*, No. CXVII, pp. 174, 175) in considering the present incarnation as the thirteenth and not the fourteenth as Pundit Nain Singh's account would imply. (*Report of G. T. Survey for 1866-67*, p. xxiv).”

“I also send an extract from the report of the Nepalese Vakeel at Lhasa to the Durbar on the subject of the installation, and have added a note or two.”

Programme of bringing the Potla Lama into Lhasa.

“On the 10th* of Sawun Sudi all officers of the Bhote (Tibetan) Government and the Bánrás (monks) of the several Gumbas (monasteries) down to the rank of Chitúm† should pitch their tents and remain in waiting.

From the 10th,‡ until the 12th Sawun Sudi, every one must remain in his tent.

On the 12th§ of Sawun Sudi the Lama is brought into the tent and put on the gaddi, when according to precedence the Ambahs and others present Khata|| and a *natch* is held.

On the 13th¶ of Sawun Sudi, the Lamá is conveyed from the tent to

* 28th July, 1879.

† The exact nature of this rank is not known at Katmandu.

‡ From 28th July to 8th August, 1879.

§ 30th July, 1879.

|| A silk article of dress like a sash.

¶ 31st July, 1879.

Potla,* the road is lined by Banras of the several Gumbas on both sides, each with an umbrella and a flag for presentation. Thus attended the Lama is conveyed from Rika† to Potla, and Chinese and Bhotia officers join in the procession.

On the 14th‡ of Sawun Sudi, the Lama is put on the *gaddi*. Before putting him on the *gaddi*, the Lama is made to stand before the *gaddi*, and Ambah puts the presents from the Emperor of China before him and two papers in Chinese and another in Bhotia are read. The Lama then facing to the East kneels down and bows his head in obeisance to the Emperor of China. He, after going through these ceremonies, sits on the *gaddi*. The Chinese papers alluded to above are explained to be an order from the Emperor of China to the effect that having learnt from the Lama,§ the Chinese Ambahs and the four Kájis of Bhote, that the present Lama has identified the things left by the late deceased Lama as his own, the Emperor authorizes him to sit on his former *gaddi*. When the Lama is conveyed from Rika to Potla the road is swept, and the windows and doors of the houses are adorned with fringes and purdahs and the terraces with flags. Any man omitting to do this, is severely punished.

Dated 12th of Bhadon badi Samvat 1936 (14th August, 1879).

DR. RÁJENDRALÁLA MITRA exhibited a collection of Jain Na-
Paintings lately obtained from Rajputana.

Dr. Mitra said,—the collection comprised two sets of paintings, representing the twenty-four Tirthankaras of the Jains, and the other forty-eight Jinas or forms of Jina. Artistically they were of no value and as regards age, he thought, they could not be much more than a hundred and fifty years old, though the seller represented that they were much older. The first set, moreover, was very monotonous. The pictures, the grouping, the details of ornamentation, and the colouring, were alike in all the paintings. The principal image is a nude male, standing in a standing posture on a lotus, and having the hands hanging by the side. Below the lotus there is a throne, and on the rim of it there is the distinctive emblem of the saint, and it is different in every case; the colour of the images varies in some of the paintings, but the prevailing colour is yellow or gold. On each side of the image there is an attendant waving an ox-tail *chakra*. The likeness of this attendant is the same in all the paintings, so is that of a man standing with joined hands on the right side. This person is said

• The Palace Monastery of the Dalai Lama on the plain of Lhasa.

† Apparently the place where the present Lama was discovered.

‡ 1st August, 1879.

§ I do not recognize the appellation. The other three great incarnations are the Teslu Lama of Tibet, the Taranath Lama of Urga and the Changai Lama of Peking.

be the king in whose reign the saint flourished. The name of the saint and that of the king are written in golden letters. As the first twenty-one or twenty-two Tīrthankaras are believed by Oriental scholars to be apocryphal, conjured up to cast a halo of antiquity on the system of religion which the last two or three disseminated, (the last alone is a historical character,) it is not to be wondered at that there should be so much sameness in their likenesses; but as the history of Jainism is a matter of considerable importance, the pictures are of interest as containing the ideas of the Jains on the subject.

The following is a descriptive list of the saints, their colours, their emblems and the names of the different kings in whose reigns they flourished.

List of Tīrthankaras.

No.	Name.	Colour.	Emblem.	Name of king in whose reign he flourished.
1.	Ādinātha.*	Yellow.	Bull.	Bharata Chakrí.
2.	Ajitanātha.	Yellow.	Elephant.	Sagara Chakrí.
3.	Sambhavanātha.	Yellow.	Horse.	Satyavírya.
4.	Abhinandana.	Yellow.	Monkey.	Mitrabháva.
5.	Sumatinātha.	Yellow.	Curlew.	Mitravírya.
6.	Padmaprabha.	Red.	Red lotus.	Yamadyúti.
7.	Supársvanātha.	Yellow.	Svastika.	Dharmavírya.
8.	Chandraprabha.	Lead.†	Crescent.	Dánavírya.
9.	Pushpadanta.	White.	Crocodile.	Meghavata.
10.	Sítalanātha.	Yellow.	Śrīvatsa.‡	Simandha.
11.	Śreyáñsanātha.	Yellow.	Rhinoceros.	Tripishta Vásudeva.
12.	Vasupújya.	Red.	Buffalo.	Dvipishta Vásudeva.
13.	Vimalanātha.	Yellow.	Boar.	Svayambhu Vásudeva.
14.	Anantanātha.	Yellow.	Ram.§	Purushottama Vásudeva.
15.	Dharmanātha.	Yellow.	Spike-headed club	Puṇḍarika Vásudeva.
16.	Sántinātha.	Yellow.	Black antelope.	Purushadatta.
17.	Kunthanātha.	Yellow.	Goat.	Kunála.
18.	Aranātha.	Yellow.	Fish.||	Govinda.

* *Alias* Rishabha.

† White according to Stevenson in the Preface to his translation of the Kalpa.

‡ Diamond ditto.

§ Falcon ditto.

|| Nandávartha ditto.

19.	Mallinátha.	Yellow.*	Water jar.	Suluma.
20.	Muni Suvrata.	Blue.†	Tortoise.	Ajita.
21.	Taminátha.	Gold.‡	Red lotus§	Vijaya.
22.	Neminátha.	Blue.||	Conch-shell.	Ugrasena.
23.	Pársvanátha.	Copper.¶	Serpent.	Ajita.
24.	Mahávira.	Gold.**	Lion.	Srenika.

The second set is not so monotonous as the first. In it each picture has a likeness of a Jina seated cross-legged like a Buddha in meditation, with devotees seated around, and a scene of a forest, a garden, a river, wild animals, wars, or a combat in front. The figure of the Jina is not always the same, the colour varies in some cases, and in two instances there are three heads. Whether these peculiarities are intended to imply that the Jinas are different personages, or the same personage in different characters, Dr. Mitra could not make out. To each picture is attached a page of mantras in Sanskrit, and interpretations and instructions in Mágadhi for the mode of reciting them. In these each Jina has a distinctive name.

The following are the names given :—

List of 48 Jinas.

No.	Name.	No.	Name.
1.	Bhaktámara.	19.	Dyutidiptimanmukha
2.	Suralokasañstuta.	20.	Jñānamaya.
3.	Vibudhārchitapādapiṭha.	21.	Toshitahṛidaya.
4.	Subodhi.	22.	Satputradātā.
5.	Muníndra.	23.	Paramapurusha.
6.	Mukharita-bhakta.	24.	Avyaya.
7.	Pāpakshayañkara.	25.	Purushottama.
8.	Arhat.	26.	Tribhuvanārtihara.
9.	Astasamastadosha.	27.	Vinásaguna.
10.	Bhuvanabhushana.	28.	Asokatarupratihārya.
11.	Animeshāvilokanīya.	29.	Siñhāsanapratihārya.
12.	Surūpa.	30.	Chāmarapratihārya.
13.	Subhavaktra.	31.	Chhatratrayapratihārya.
14.	Śas'āñkasubhraguna.	32.	Dundubhipratihārya.
15.	Manovivekarahita.	33.	Pushpavrishtipratihārya.
16.	Suryātisāyīmahimā.	34.	Bhāmaṇḍalapratihārya.
17.	Suryātisāyīmahimā.	35.	Divyadhvanipratihārya.
18.	Chandramukha.	36.	Padmoparadhishtitacharana.

* Blue according to Rev. Stevenson.

† Black ditto.

‡ Yellow ditto.

§ Blue lotus ditto.

|| Black ditto.

¶ Blue ditto.

** Yellow ditto.

- | | |
|---|----------------------------|
| 37. Adbhutavibhúti. | 42. Sañgrámabhayaniváraka. |
| 38. Gajabhayaniváraka. | 43. Yuddhabhayaniváraka. |
| 39. Bhinnakarikumbha-galaduj-
valasonitáktamuktáphala-
bhushitabhumistha. | 44. Rishabhanáthapurusha. |
| 40. Rishabhadeva. | 45. Rogabhayaniváraka. |
| 41. Sarpabhayaniváraka. | 46. Bandhanabhayaháraka. |
| | 47. Asṭabhayaniváraka. |
| | 48. Vṛishabha. |

The Rev. FATHER LAFONT, S. J., exhibited some of W. Crookes' High Vacuum tubes such as were produced by the inventor at the Sheffield Meeting of the British Association in August last. Two points of great interest were especially noticed: the first is that contrary to our usual views of the electric current, the flow in these high vacua evidently proceeds from the *negative* pole of the inductorium. This was prettily shown by two different electrical Radiometers: their delicately balanced vanes were set in rapid rotatory motion by the recoil caused by the matter projected from their surfaces when made the *negative* electrode of a large Rhumkorff's Coil, whereas they remained stationary when made the *positive* electrode. One of these radiometers very clearly showed the dark space of mean molecular free path mentioned in Crookes' lecture on "Radiant Matter."

The second phenomenon showing a departure from the ordinary laws of electrical manifestations, pointed out by Father Lafont, was the apparent inactivity of the positive pole. The negative pole seems totally indifferent towards it. In ordinary Geissler's tubes the luminous track finds always its way through most complicated windings, from positive to negative, in Crookes' tubes the flow of luminous matter is darted in space *straight* in front of the *negative* pole without rejoining the positive pole. This was evidenced by two tubes in one of which a little concave mirror projected a distinct *focus* on the surface of the glass in front of it, showing no tendency whatever to the positive electrode placed quite close but above the mirror.

In a second tube a distinct *shadow* was visible on the surface of the glass opposite the negative pole: the shadow being thrown by little glass-screens placed on the path of the atoms projected by the negative pole.

These and similar facts bid fair, when properly investigated, to give us a better and more intimate notion of the nature of electricity and also of the constitution of matter. Crookes himself sees in these tubes, matter in something like a fourth state, which he calls, after Faraday, the *ultra-gaseous* state. Father Lafont remarked that the well-known and somewhat puzzling phenomenon of *stratification* of light in Geissler's tubes, seems to be simply explained, by admitting that these alternations of obscure and vivid bands, are the result of the high rarefaction of the gases, permitting

the atoms to move through appreciable spaces (Crookes' *dark space*), before collision and light being produced.

The NATURAL HISTORY SECRETARY (Mr. Wood-Mason) drew attention to a remarkably fine head of *Ovis Poli* which had that day been presented to the Indian Museum by Major Biddulph, who had just brought it down from Gilgit. The horns measured nearly 68 inches along the outer curve, that is to say, more than 4 inches more, though from the more closely wound spiral which they described they were rather less in expanse, than those of the great head of the same species presented to the National Collection by Colonel T. E. Gordon, who procured it when he took part in the Second Yarkand Mission. Mr. Wood-Mason also exhibited a head of the Suleman form (*Capra megaceros*) of the 'Markhor' (*O. Falconeri*) to show the difference between its horns and those of a fine head of the Cashmere variety (*Capra Falconeri*) exhibited by Major Biddulph.

Major BIDDULPH said,—the head to which Mr. Wood-Mason has called attention was sent in to me last year by the Chief of Hunza, in the northern part of whose territories great numbers of *Ovis Poli* are to be found. I cannot conceive that it will be easily possible to find a finer head than this, which is several inches longer than the one presented in 1875 to the British Museum by Lieut.-Colonel T. E. Gordon, as the measurements given below will show. This head, however, has not the horns quite so thick at the base, and they taper more gradually than in the British Museum head. They also measure slightly less from tip to tip. The strength of the neck muscles* must be enormous to allow of so great a weight being easily carried, and it is doubtless owing to this weight that the *O. Poli* and other great wild Sheep that I have noticed have a very erect carriage. A tape passed across from tip to tip shows that the muzzle of the animal must project considerably beyond the straight line, so that the native legend of animals dying on account of their not being able to feed by reason of the projection of their horns, cannot be true.

	<i>O. P.</i> head presented to Ind. Mus. by Major Biddulph.	<i>O. P.</i> head in Brit. Mus. presented by Col. Gordon.	
Length of horn round curve, ..	67 3 $\frac{3}{4}$	63	N. B. One horn measures $\frac{1}{2}$ inch less than the other.
Circumference at base,	16	16 1 $\frac{1}{4}$	
Ditto at 1 foot,	15 5 $\frac{3}{4}$	15 1 $\frac{1}{4}$	
Ditto at 2 feet,	14 1 $\frac{1}{4}$	14 3 $\frac{3}{4}$	
Ditto at 3 feet,	12 3 $\frac{3}{4}$	12 3 $\frac{1}{4}$	
Ditto at 4 feet,	9 1 $\frac{1}{4}$	9	
From tip to tip in a straight line,	53 3 $\frac{1}{4}$	54	

* But especially of the *ligamentum nuchae*, which mainly sustains the weight of the head.—(J. W.-M.)

The measurements of the British Museum head are taken from the Proceedings of the Zoological Society of London for 1875, p. 523.

The following papers were read:—

1. *A Collection of Hindi Roots, with remarks on their derivation and classification.*—By DR. A. F. RUDOLF HOERNLE.

(Abstract.)

This collection contains upwards of 500 roots. They are divided into two classes, Primary and Secondary. The former contains roots which are identical with Sanskrit ones, though more or less disguised by phonetic modifications. These disguises are produced by various cases; 1, by phonetic permutation; *e. g.*, *chal* or *char* “walk” = Skr. *chal*; *khá* “eat” = Skr. *khád*; *paros* “distribute” = Skr. *parivesh*;—2, by incorporation of the “class-suffix”; *e. g.*, *bújh* “know” = Skr. *budh* + *ya*; *bhanj* “break” = Skr. *bhanaj* (*bhaj*); *sun* “hear” = Skr. *śru* + *nu*; *ján* “know” = Skr. *jñá* + *ná*.—3, by incorporation of the passive suffix *ya*; *e. g.*, *lag* “belong” = Skr. *lag* + *ya*; *sích* “irrigate” = Skr. *sích-ya*;—4, by change of “class”; *e. g.*, *páva* “obtain” (VIth) = Skr. *prap-nu* (Vth); *kara* “do” (VIth) = Skr. *kar-u* (VIIIth); *jána* “know” (VIth) = Skr. *jñá* + *ná* (IXth);—5, by change of “voice”; *e. g.*, *bhaj* “break” (act.) = Skr. *bhaj-ya* “be broken” (pass.); *de* “give” = Skr. *díya* (*dá* + *ya*) “be given”;—6, by addition of the pleonastic suffix *api*; *e. g.*, *suháv* “be pleasant” = Skr. *sukh*. Secondary roots are those, as to which there are no identical roots in Skr., though ultimately they can be traced to Skr. roots. Such roots are either 1, derivative; *e. g.*, *nah* “flow,” from *nahá* “bathe” = Skr. *sná*; or 2, denominative; *e. g.*, *jam* “germinate,” from Skr. noun *janma* “birth,” of Skr. root *jan* “be born”; *pañh* “enter,” from Skr. participle *pravishṭa* “entered,” of Skr. root *praviṣ* “enter”; or 3, compound; *e. g.*, *chuk* “cease,” from Skr. *chhut* + *kṛ*, of Skr. noun *chhut* “flowing away” and Skr. root *kṛ* “make”; *rok* “hinder, stop,” from Skr. *rut* + *kṛ*, of Skr. noun *rudh* “hindering” and root *kṛ*; *kasak* “pain,” from Skr. *kasha* + *kṛ*. There remain a small number of roots, which it is not possible at present to bring under either of the two classes; *e. g.*, *dho* “carry.”

DR. RÁJENDRALÁLA MITRA thought the paper laid on the table was worthy of special note. It treated of a subject of great importance in connexion with the philology of the Indian vernaculars, and, knowing how ably its learned author had discussed the comparative grammar of the Sanskritic dialects in his papers on the so-called Gaudian languages published in the Society's Journal, Dr. Mitra had no doubt that the contribution now

received would prove equally interesting. He had no opportunity of reading the paper, and was not aware of the exact direction it had taken; but its title appeared to him misleading. It suggested to him the previous question, was there such a thing as a Hindi root distinct from Sanskrit roots? Of course there were in Hindi, as in other vernaculars, a great many nominal roots formed from nouns, in the same way in which in English the noun cane produced caning; but he did not refer to them. By roots he meant radicals of verbs originally implying action, and not names of things. In this sense he believed there were no Hindi roots as distinct from Sanskrit roots, or in other words, the roots of the Hindi, as of all other Aryan dialects of India, were derived from the Sanskrit. Even as the Sanskrit nouns and other vocables had, under climatic and other influences, gradually undergone wear and tear in different ways till they resulted in the vernaculars, so had the roots; and the transition was entirely governed by the laws of phonetic decay and dialectic regeneration. For instance the Vedic *bhu* 'to be,' changed to *ho* in the Hindi,—the change commenced at a very early age and is still traceable, though rarely, in some Vedic and other ancient writings—so did all the other roots which were required for the derivative dialects. In the course of his reading Dr. Mitra had not found a single Hindi root which could not be shown to be a decayed or regenerated Sanskrit radical, and he believed that an enquiry into Hindi roots for philological purposes must necessarily be the same as an enquiry into the decay and regeneration of the phonetic elements of a language. Whether this was the line of Dr. Hoernle's enquiry or not he was not aware, but he thought it well to point out the misleading character of the title.

Dr. Hoernle explained that Dr. Mitra's remarks were founded on a misapprehension of the scope of his paper, the points of view in which did not materially differ from those expressed by Dr. Mitra. He understood by roots the constant element in any series of sense-related words; thus in the Hindi words *bolí* "speech," *bolat* "speaking," *bolai* "he speaks," *bolávaṭ* or *boláva* "calling," *bol* is the constant element or root. Hindi, like every other language, had such roots. The object of the paper was to collect these Hindi roots, to discuss the various ways of their derivation from Sanskrit or elsewhere, and to classify them accordingly.

2. *On the occurrence of the Musk Deer in Tibet.*—By
R. LYDEKKER, B. A.

This note will be published in Journal, Part II, No. 4, for 1879.

The following communication has been received:—

Coins of the Sunga or Mitra Dynasty found at Ramnagar or Ahichhatra. By A. CARLLEYLE. Communicated by H. RIVETT-CARNAC, Esq.,
C. S., C. I. E.

LIBRARY.

The following additions have been made to the Library since the Meeting held in November last.

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No. 3. *Graves, Rt. Rev. C.*—On the Croix Gammée, or Swastika.

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No. 99. *Lockwood, E.*—Notes on the Mahwa Tree (*Bassia latifolia*). *Meehan, T.*—On the Laws governing the Production of Seed in *Wistaria sinensis*. *Baker, J. G.*—A Synopsis of *Hypoxidaceæ*. *Stirton, J.*—Remarks on Mr. Crombie's Paper on the "Challenger" Lichens in Journ. Linn. Soc. Vol. XVI. *Allman, Prof.*—Note on the probable Migration of *Pinguicula grandiflora* through the Agency of Birds. *Clarke, C. B.*—On Two Kinds of Dimorphism in the *Rubiaceæ*.

No. 100. *Abbay, Rev. R.*—Observations on *Hemileia vastatrix*, the so-called Coffee-leaf Disease. *Bentham, G.*—Notes on *Euphorbiaceæ*.

No. 101. *Bennett, A. W.*—Notes on Cleistogamic Flowers; chiefly of *Viola*, *Oxalis*, and *Impatiens*. *Clarke, C. B.*—Note on *Gardenia turgida* (Roxb.). *Weale, W. M.*—Note on South-African Orchids. *Henslow, Rev. G.*—On the Absorption of Rain and Dew by the Green Parts of Plants. *Dyer, W. T. T.*—Note on the Fruiting of *Wistaria sinensis* in Europe.

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No. 73. *Bastian, Dr. H. C.*—On the Conditions favouring Fermentation and the Appearance of *Bacilli*, *Micrococci* and *Torulæ* in previously Boiled Fluids.

No. 74. *Bastian, Dr. H. C.*—On the Conditions favouring Fermentation and

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No. 7. *Doran, A. H. G.*—Morphology of the Mammalian *Ossicula auditus*.

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No. 9. *Menschutkin, N.*—Recherche sur l'Influence exercée par l'Isomérisme des Alcools et des Acides sur la Formation des E'thers composés.

No. 10. *Famintzin, A.*—Embryologische Studien.

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222	31	After " Vol. XIV," omit " of."	
231	2	Omit " (See Schuyler's Turkistan)."	

I N D E X

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[APPENDIX.]

LIST OF MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL.
ON THE 31ST DECEMBER 1878.

LIST OF ORDINARY MEMBERS.

R. = Resident. N. R. = Non-Resident. N. S. = Non-Subscribing.

L. M. = Life Members. F. M. = Foreign Member.

N. B.—Members who have changed their residence, since this list was drawn up, are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alterations may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the *Secretaries*.

Members who are about to leave India and do not intend to return, are particularly requested to notify to the *Secretaries*, whether it be their desire to continue as members of the Society, otherwise, in accordance with Rule 40 of the Bye-laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

Date of Election.		
1860 Dec. 5.	R.	Abdul-Latif, Khán Bahádur, Maulawí. <i>Calcutta</i> .
1868 Sept. 2.	N.S.	Adam, R. M. <i>Europe</i> .
1878 Mar. 6.	R.	Adharlal Sen, B. A., Babu. <i>Calcutta</i> .
1860 July 4.	N.R.	Ahmad Khán Bahádur, Sayyid, c. s. l. <i>Benares</i> .
1872 April 3.	N.R.	Ahsan-ullah, Nawáb. <i>Dacca</i> .
1860 April 4.	N.R.	Aitchison, J. E. T., M. D., Surgeon-Major, 29th N. I. <i>Talagong</i> .
1871 June 7.	N.R.	Alexander, J. W. Ajmere College. <i>Ajmere, Rajpootana</i> .
1878 Mar. 6.	N.R.	Allen, G. W., c. i. e., <i>Pioneer Press, Allahabad</i> .
1860 Oct. 3.	R.	Amír Alí, Khán Bahádur, Nawáb. <i>Calcutta</i> .
1874 June 3.	R.	Amír Alí, Sayyid, Barrister at Law. <i>Calcutta</i> .
1865 Jan. 11.	R.	Anderson, John, M. D., F. L. S., Superintendent, Indian Museum. <i>Calcutta</i> .
1878 Aug. 29.	R.	Anthony, A. H., Financial Department. <i>Calcutta</i> .
1875 June 2.	R.	Apcar, J. G., Barrister at Law. <i>Calcutta</i> .
1875 Feb. 3.	N.R.	Armstrong, J., Surgeon, Beng. Army. Marine Survey Department.
1877 June 6.	R.	Arnold, Henry Kerchever Walter, Offg. Asst. Secretary, Indian Museum. <i>Calcutta</i> .
1877 July 4.	R.	Ashgar Ali Khan, Nawáb Diler Jang Bahadúr, c. s. r., <i>Calcutta</i> .
1871 Sept. 6.	N.R.	Atkinson, Edwin Felix Thomas, B. A., c. s., Offg. Acct. General, N. W. P. <i>Allahabad</i> .
1869 Feb. 3.	N.R.	Attar Singh Bahádur, Sirdár, M. U. F., Chief of Bhadour. <i>Ludiana</i> .
1870 Feb. 2.	N.R.	Baden-Powell, Baden Henry, c. s., Conservator of Forests. <i>Lahore</i> .
1878 Aug. 6.	N.R.	Badgley, Major William Francis, s. c., Offg. Deputy Superintendent of Surveys. <i>Shillong</i> .

Date of Election.		
1862 Feb. 5.	R.	Baisák, Gaurdás, Bábu, Depy. Magistrate. <i>Serampur.</i>
1865 Nov. 7.	F.M.	Ball, Valentine, M. A., F. G. S., Geol. Survey of India. <i>Geological Survey Office. Europe.</i>
1860 Nov. 1.	R.	Banerjea, Rev. Kristno Mohun, LL. D. <i>Calcutta.</i>
1876 June 7.	R.	Baness, John Frederick, Chief Draftsman, Surveyor General's Office. <i>Calcutta.</i>
1878 July 3.	N.R.	Barbe, H. L. St., c. s. <i>Bhamo Residency.</i>
1869 Dec. 1.	N.R.	Barker, R. A., M. A., Civil Surgeon. <i>Bogra.</i>
1860 July 4.	R.	Batten, George Henry Maxwell, c. s., Barrister at Law, Famine Commissioner. <i>Calcutta.</i>
1859 May 4.	L.M.	Bayley, Edward Clive, The Hon. Sir, B. C. S., K. C. S. I., C. I. E. <i>Europe.</i>
1878 June 5.	N.R.	Bayley, C. S., c. s. <i>Jessore.</i>
1873 Feb. 5.	R.	Bayne, R. R., M. B. I. B. A., Draughtsman, Chief Engineer's Office, E. I. Railway. <i>Calcutta.</i>
1864 Sept. 7.	N.R.	Beames, John, B. C. S., Magistrate and Collector. <i>Chittagong.</i>
1841 April 7.	L.M.	Beaufort, F. L., B. C. S., (retired). 62, <i>Montague Square, Hyde Park, London.</i>
1878 Sept. 25.	N.R.	Beighton, T. D., c. s., Joint Magistrate. <i>Balasore.</i>
1862 Oct. 8.	R.	Bernard, Charles Edward, c. s., Secy. to the Govt. of India, Home Department. <i>Calcutta.</i>
1872 Aug. 7.	R.	Beverley, Henry, M. A., c. s., Offg. District and Sessions Judge, 24-Pergunnahs. <i>Calcutta.</i>
1876 Nov. 15.	N.R.	Beveridge, Henry, c. s., District and Sessions Judge, <i>Rangpur.</i>
1875 July 7.	N.R.	Black, F. C., Asst. Engineer. <i>Hamirpur, N. W. P.</i>
1873 Dec. 3.	R.	Blackburn, J., Manager, Oriental Gas Company, <i>Calcutta.</i>
1857 Mar. 4.	L.M.	Blanford, H. F., A. B. S. M., F. G. S., Meteorological Reporter, Govt. of India. <i>Europe.</i>
1859 Aug. 3.	R.	Blanford, W. T., A. B. S. M., F. R. S., F. G. S., Depy. Supdt. Geological Survey of India. <i>Geological Survey Office. Calcutta.</i>
1873 April 2.	N.R.	Blissett, T., Superintendent Telegraph Stores. <i>Nagpur.</i>
1877 May 2.	R.	Bourdillon, James Austin, c. s., Offg. Inspector General of Registration. <i>Calcutta.</i>
1876 Nov. 15.	N.S.	Bowie, Major M. M. <i>Europe.</i>
1868 Jan. 15.	N.R.	Boxwell, John, c. s., Offg. Deputy Commissioner. <i>Dumka, Sonthal Pergunnahs.</i>
1876 May 4.	N.R.	Bradshaw, A. F., Surgeon Major, Surgeon to the Commander-in-Chief. <i>Simla.</i>
1860 Mar. 7.	R.	Brandis, Dietrich, PH. D., Inspector General of Forests. <i>Calcutta.</i>
1872 June 5.	R.	Brooks, W. E., c. E., Supdg. Engineer, E. I. Railway. <i>Howrah.</i>
1871 Jan. 4.	R.	Brough, R. S., Offg. Electrician, Telegraph Store Department. <i>Calcutta.</i>

Date of Election.		
1866 Nov. 7.	N.R.	Browne, Col. Horace Albert, Commissioner of Pegu. <i>Rangoon.</i>
1871 Sept. 6.	N.R.	Buckle, H., Deputy Commissioner. <i>Toungthoo, Burma.</i>
1869 Jan. 20.	N.R.	Cadell, Alan, B. A., c. s., Settlement Officer. <i>Banda.</i>
1873 Mar. 5.	R.	Cappel, A. J. L., Depy. Director General of Telegraphs. <i>Calcutta.</i>
1876 Nov. 15.	R.	Cayley, Surgeon-Major H., Surgeon, Mayo Native Hospital. <i>Calcutta.</i>
1875 April 4.	R.	Chambers, Dr. E. W. <i>Calcutta.</i>
1861 Mar. 1.	N.R.	Chaudhuri, Harachandra Bábu, Zamindar. <i>Sherpur, Maimansingh.</i>
1874 Aug. 5.	N.S.	Chennell, A. W., Asst. Surveyor, Survey Dept. <i>Europe.</i>
1868 Feb. 5.	N.R.	Clark, Lieut.-Col. Edgar Gibson, s. c., Asst. Commissioner. <i>Kheri, Oudh.</i>
1877 Aug. 30.	R.	Clarke, Capt. Henry Wilberforce, R. E., Depy. Consulting Engr., Govt. of India, for Guaranteed Railways. <i>Calcutta.</i>
1878 Feb. 6.	R.	Clarke, Colonel the Hon'ble Sir A., R. E., K. C. M. G., C. B. C. I. E. <i>Calcutta.</i>
1878 Mar. 6.	R.	Cockerell, The Hon'ble H. A. <i>Calcutta.</i>
1877 Mar. 7.	R.	Colvin, The Hon. Bazett Wetenhall, c. s., Member of the Governor-General's Council. <i>Calcutta.</i>
1874 Nov. 4.	N.R.	Constable, Archibald, Asst. Engineer, Railway Dept. <i>Lucknow.</i>
1876 Mar. 1.	R.	Crawford, James, B. A., c. s., Barrister at Law, Registrar, High Court. <i>Calcutta.</i>
1877 June 6.	R.	Croft, A. W., M. A., Offg. Director of Public Instruction. <i>Calcutta.</i>
1874 Mar. 4.	N.R.	Crombie, Alexander, M. D., Civil Surgeon. <i>Dacca.</i>
1877 Feb. 7.	N.R.	Crooke, William, c. s., Offg. Joint Magistrate. <i>Gorakhpur.</i>
1873 Aug. 6.	R.	Cunningham, David Douglas, M. B., Special Asst. to the Sanitary Commissioner with the Govt. of India. <i>Calcutta.</i>
1847 June 2.	F.M.	Dalton, Major-General Edward Tuite, c. s. i., s. c. (retired). <i>Europe (care of Messrs. Gillanders, Arbuthnot and Co., Calcutta.)</i>
1870 May 4.	N.R.	Damant, Guybon Henry, c. s., Political Officer in charge, Naga Hills. <i>Samaguting.</i>
1873 Dec. 3.	N.R.	Dames, Mansel Longworth, c. s., Asst. Commissioner. <i>Dera Ghazi Khan.</i>
1865 June 7.	N.R.	Dás, Jaykissen, Bahádur, Rájá, c. s. i. <i>Moradabad.</i>
1871 June 7.	R.	Dás, Rámkrishna, Bábu. <i>Calcutta.</i>
1869 April 7.	F.M.	Day, Dr. Francis, F. L. S., F. Z. S. <i>Europe.</i>
1856 June 4.	N.S.	DeBourbel, Lieut.-Col. Raoul, R. E. <i>Europe.</i>
1872 Aug. 7.	R.	Dejoux, P., Executive Engineer, P. W. D. <i>Calcutta.</i>

Date of Election.		
1869 Oct. 6.	N.R.	Delmerick, J. G., Extra Asst. Commissioner. <i>Delhi.</i>
1873 Jan. 8.	N.R.	Dennys, H. L., Dist. Supdt. of Police. <i>Sambalpur, C.P.</i>
1862 May 7.	N.R.	Dhanapati Singh Dughar, Raí Bahádur. <i>Azimganj.</i>
1853 Sept. 7.	N.S.	Dickens, Major-General Craven Hildesley, B. A., C. S. I., <i>Europe.</i>
1870 May 4.	F.M.	Dobson, G. E., B. A., M. B., F. L. S., <i>Royal Victoria Hospital. Netley. Southampton.</i>
1875 Mar. 3.	N.R.	Dodgson, Walter. <i>Rangpur.</i>
1878 May 2.	R.	Donaldson, P. <i>Calcutta.</i>
1875 Mar. 3.	R.	Douglas, J., Offg. Supdt. of Telegraphs. <i>Calcutta.</i>
1867 June 5.	N.R.	Duthoit, William, c. s., Magistrate and Collector. <i>Shahjahanpur. N. W. P.</i>
1873 Aug. 6.	R.	Dutt, Jogesh Chunder, Bábu. <i>Calcutta.</i>
1877 Aug. 30.	N.R.	Dutt, Kedarnath, Bibu, Depy. Magistrate. <i>Bogra.</i>
1869 June 2.	N.R.	Dutt, Udaychand, Bábu. <i>Faridpur.</i>
1873 April 2.	R.	Dutt, Umesh Chunder, Bábu. <i>Calcutta.</i>
1870 Mar. 8.	L.M.	Edinburgh, H. R. H. The Duke of. <i>Europe.</i>
1863 May 6.	N.R.	Edgar, John Ware, c. s. I., c. s., Offg. Magistrate and Collector. <i>Shahabad. L. P.</i>
1874 Dec. 2.	N.R.	Egerton, The Hon. Robert Eyles, c. s., c. s. I., Lieut.- Governor of the Panjab. <i>Lahore.</i>
1871 Dec. 2.	R.	Eliot, J., M. A., Offg. Meteorological Reporter to Govt. of India. <i>Calcutta.</i>
1871 Oct. 4.	N.R.	Evezard, Col. G. E. <i>Deesa, Gujarat.</i>
1863 Oct. 7.	N.S.	Ewart, Surgeon-Major J., M. D. <i>Europe.</i>
1859 Dec. 7.	R.	Fath Alí, Maulawí. <i>Calcutta.</i>
1863 Jan. 15.	F.M.	Fedden, Francis, Asst. Geological Survey of India. <i>Geol. Survey Office. Europe.</i>
1876 Jan. 5.	R.	Feistmantel, Ottokar, M. D., Palæontologist, Geologi- cal Survey of India. <i>Calcutta.</i>
1876 July 5.	N.R.	Foulkes, The Rev. Thos., Chaplain. <i>Bangalore.</i>
1868 May 6.	N.R.	Field, Charles Dickenson, M. A., LL. D., c. s., Barrister at Law, District Sessions Judge. <i>Burdwan.</i>
1869 Sept. 1.	N.R.	Fisher, John Hadden, c. s., Depy. Commissioner. <i>Jabalpur.</i>
1872 Dec. 4.	N.R.	Forbes, Major John Greenlaw, B. E., Supdg. Engineer. N. W. P. & Oudh Irrigation Branch. <i>Lucknow.</i>
1875 Jan. 6.	N.R.	Forbes, Capt. C. J. F., F. R. G. S., Depy. Commissioner. <i>Tharrawaddy, Burma.</i>
1869 Oct. 12.	F.M.	Forlong, Lieut.-Col. J. G. R., M. S. C. 24, <i>St. James' Square, London.</i>
1869 Sept. 1.	N.R.	Fryer, Major G. E., Depy. Commissioner Thonkwa District. <i>Maoobung, B. Burmah.</i>
1867 Sept. 4.	R.	Fyfe, The Rev. W. C., M. A., Principal, Free Church College. <i>Calcutta.</i>
1873 Dec. 3.	N.R.	Gamble, J. S., B. A., Asst. to Inspector General of Forests. <i>Oooch Behar.</i>

Date of Election.		
1871 Aug. 2.	N.R.	Gangaprasad, Munshi, Depy. Collector. <i>Jaunpur.</i>
1874 July. 1.	N.R.	Gardner, David Mason, c. s., Offg. Magistrate and Collector. <i>Azamgarh.</i>
1859 Aug. 3.	L.M.	Gastrell, Major-General James Eardley, (retired). <i>c/o Messrs. Coutts & Co., London.</i>
1867 Dec. 4.	N.R.	Gay, E. Esq., M. A., c. s., Depy. Comptroller General. <i>Bombay.</i>
1877 Aug. 30.	R.	Ghosha, Jnanendra Chandra Bábu. <i>Calcutta.</i>
1871 May 3.	R.	Ghosha, Káliprasanna Bábu. <i>Calcutta.</i>
1877 Dec. 5.	N.R.	Ghosha, Dr. Krishna Dhava. <i>Rungpur.</i>
1869 Feb. 3.	R.	Ghosha, Pratápachandra Bábu, B. A. <i>Calcutta.</i>
1870 May 4.	R.	Ghoshál, Satyánand, Rájá. <i>Calcutta.</i>
1875 July 7.	N.S.	Girdlestone, Charles Edward Ridgway, c. s. <i>Europe.</i>
1861 Feb. 5.	F.M.	Godwin-Austen, Lieut.-Colonel H. H., F. Z. S., F. R. G. S. <i>United Service Club, St. James', London.</i>
1862 July 2.	N.R.	Gordon, Robert, c. E., Executive Engineer, P. W. D., <i>Henzada, B. Burmah.</i>
1869 July 7.	N.R.	Gordon, James Davidson, c. s., c. s. I., Offg. Chief Commissioner. <i>Mysore.</i>
1875 July 7.	N.S.	Gouldsbury, J. R. E. <i>Europe.</i>
1863 Nov. 4.	F.M.	Gowan, Major-General J. Y. <i>Woodlands, Wimbledon, London.</i>
1877 Nov. 7.	L.M.	Grant, Alexander, M. I. C. E., Director of State Railways <i>Allahabad.</i>
1866 June 6.	R.	Gribble, Thomas William, B. C. S. <i>Calcutta.</i>
1876 Nov. 15.	N.R.	Grierson, George Abraham, c. s., Offg. Joint Magistrate. <i>Madhubani, Darbhanga, Tirhut.</i>
1861 Sept. 4.	N.R.	Griffin, Lepel Henry, B. C. S., Depy. Commissioner and Offg. Secy. to the Govt. of Punjab. <i>Lahore.</i>
1878 May 2.	N.R.	Griffith, R. <i>Allahabad.</i>
1861 Feb. 6.	N.R.	Growse, Frederick Salmon, M. A., C. S., C. I. E., Joint Magistrate. <i>Bulandshahr, N. W. P.</i>
Jan. 6.	N.S.	Gunn, John Sutherland, M. B., Surgeon, 4th Bengal Cavalry. <i>Europe.</i>
1867 July 3.	N.R.	Hacket, Charles Augustus, Asst. Geol. Survey of India.
1861 Feb. 2.	N.R.	Harrison, A. S., B. A., Principal, Muir Central College. <i>Allahabad.</i>
1877 Sept. 27.	R.	Hart, J., Attorney at Law. <i>Calcutta.</i>
1875 Mar. 3.	N.R.	Hendley, Dr. Thomas Holbein, Residency Surgeon. <i>Jaipur, Rájputáná.</i>
1875 Aug. 4.	N.S.	Hewitt, James Francis Katherinus, c. s., Magistrate and Collector. <i>Europe.</i>
1872 Dec. 4.	R.	Hoernle, Rev. A. F. R., PH. D. Cathedral Mission College. <i>Calcutta.</i>
1878 Mar. 6.	N.R.	Hoey, W. <i>Unao, Oudh.</i>

Date of Election.		
1868 Nov. 4.	N.R.	Holroyd, Major William Rice Morland. Director of Public Instruction. <i>Lahore, Panjab.</i>
1873 Jan. 8.	L.M.	Houstoun, G. L., F. G. S. <i>Johnstone Castle, Renfrewshire, Scotland.</i>
1863 Jan. 15.	N.R.	Howell, Mortimer Sloper, C. S., Joint Magistrate. <i>Fatihpur.</i>
1866 Feb. 7.	N.S.	Hoyle, G. W., Attorney at Law. <i>Not known.</i>
1867 Aug. 7.	N.R.	Hughes, T. H., A. R. S. M., F. G. S., Asst. Geol. Survey of India. <i>Europe.</i>
1866 Jan. 17.	N.R.	Hughes, Captain W. G., M. S. C., Depy. Commissioner, Hill Tracts. <i>Arracan.</i>
1878 Sept. 25.	N.R.	Hughes, G., C. S., Assistant Commissioner. <i>Montgomery, Panjab.</i>
1870 Jan. 5.	R.	Hume, Allan Octavian, C. B., C. S., Secy. to the Govt. of India, Dept. of Revenue, Agriculture and Commerce. <i>Calcutta.</i>
1870 June 1.	N.S.	Hunter, William Wilson, C. S., LL. D., Director General of Gazetteers to the Govt. of India. 6, <i>Grosvenor St., Edinburgh, Scotland.</i>
1868 April 1.	N.S.	Hyde, Col. Henry, R. E. <i>Europe.</i>
1872 Dec. 4.	N.R.	Ibbetson, Denzil Charles Jelf, C. S., Asst. Commissioner. <i>Karnál, Panjab.</i>
1866 Mar. 7.	N.R.	Irvine, William, C. S., Joint Magistrate. <i>Futteghar.</i>
1871 Mar. 8.	R.	Isaac, T. S., C. E., Supdg. Engineer, P. W. D., Presidency Circle. <i>Calcutta.</i>
1874 Feb. 4.	N.S.	Jackson, Surgeon Major Charles Julian. <i>Europe.</i>
1878 May. 2.	R.	Jackson, The Hon'ble L. S., Judge, High Court. <i>Calcutta.</i>
1876 July 5.	N.R.	Jarrad, Lieut. F. W., R. N., F. R. A. S., Depy. Superintendent, Marine Survey Dept. <i>Ratnagiri.</i>
1866 Feb. 7.	N.R.	Johnson, W. H., C. E., <i>Barrackpore.</i>
1862 Mar. 5.	N.R.	Johnstone, Major James William Hope, Depy. Commissioner. <i>Bannu, Panjab.</i>
1867 Dec. 4.	N.R.	Johnstone, Lieut.-Col. James, Political Agent. <i>Manipur, Assam.</i>
1878 Aug. 7.	N.R.	Johnstone, P. DeLacy, Depy. Commr. <i>Hoshiarpur.</i>
1873 Dec. 3.	N.R.	Johore, H. H., Maharaja of, K. C. S. I. <i>New Johore, Singapore.</i>
1873 April 2.	N.R.	Jones, Frederick, C. S., Magistrate and Collector. <i>Tipperah.</i>
1875 Nov. 3.	N.R.	Jones, Samuel Simpson, B. A., C. S., Offg. Asst. Commissioner in charge of Sonthal Pergunahs, <i>Rajmehal.</i>
1869 April 7.	R.	Kabíruddín Ahmad, Maulawí. <i>Calcutta.</i>
1878 Mar. 6.	N.R.	Keene, G. H., C. S. <i>Agra.</i>
1874 Dec. 2.	N.R.	Khudábakhsh Khan, Maulawí. <i>Patna.</i>

Date of Election.		
1867 Dec. 4.	R.	King, G., M. B., F. L. S., Supdt. Royal Botanical Gardens. <i>Sibpur, Calcutta.</i>
1862 Jan. 15.	N.R.	King, W., Jr., A. B., F. G. S., Depy. Supdt. for Madras, Geol. Survey of India. <i>Geol. Surv. Office.</i>
1875 Dec. 1.	R.	Knight, Hon'ble, J. B., C. I. E. <i>Calcutta.</i>
1877 Jan. 17.	N.R.	Kishor, Kumara Radha Deb, Juvraj of Hill Tipperah. <i>Tipperah.</i>
1878 Oct. 4.	R.	Krishna, Gopal, Babu. <i>Calcutta.</i>
1877 Sept. 27.	N.R.	LaTouche, James John Digges, B. A., C. S., Offg. Joint Magistrate. <i>Muttra.</i>
1878 Aug. 7.	R.	Lawrie, Dr. E., Medical College. <i>Calcutta.</i>
1870 July 6.	R.	Lethbridge, E. Roper, M. A., C. I. E. <i>Calcutta.</i>
1873 Feb. 5.	F.M.	Lewis, Timothy Richards, M. B., Special Asst. to Sanitary Commissioner with Govt. of India. <i>Europe.</i>
1864 Nov. 2.	R.	Locke, H. H., Principal, School of Art. <i>Calcutta.</i>
1866 Jan. 17.	N.R.	Low, James, Surveyor, G. T. Survey, <i>Thayetmyo. B. Burmah.</i>
1869 July 7.	N.S.	Lyall, Charles James, B. A., C. S., Under Secretary Govt. of India, Dept. of Revenue, Agriculture and Commerce. <i>Europe.</i>
1876 May 4.	R.	Lyall, John M., Messrs. Lyall, Rennie and Co. <i>Calcutta.</i>
1875 Jan. 6.	R.	Lydekker, Richard, Palæontologist, Geol. Survey of India. <i>Geological Survey Office, Calcutta.</i>
1870 April 6.	L.M.	Lyman, B. Smith. <i>Japan.</i>
1866 June 6.	N.S.	Macdonald, Lieut.-Col. J., B. S. C., Depy. Superintendent of Surveys. <i>Europe.</i>
1876 Dec. 6.	N.R.	Macdonald, J. C., Supdt. Tarai District. <i>Nynce Tal.</i>
1873 May 7.	N.R.	Mackay, W., C. E. <i>Nusseerabad.</i>
1873 Dec. 3.	R.	McLeod, Surgeon-Major Kenneth, M. D., Secretary to the Surgeon-General, Indian Medical Dept. <i>Calcutta.</i>
1848 April 5.	L.M.	Maclagan, Major-General Robert, R.E., F.R.S.E., F.R.G.S. <i>Lahore.</i>
1868 Dec. 2.	N.R.	Macauliffe, Michael, B. A., C. S., Depy. Commissioner. <i>Montgomery.</i>
1874 Jan. 7.	N.R.	Magrath, Charles Frederick, B. A., C. S., Joint Magistrate. <i>Monghyr.</i>
1877 June 6.	N.R.	Maharaja of Dharbhanga. <i>Dharbhanga.</i>
1867 April 3.	R.	Mainwaring, Lieut.-Col. George Byres, S. C. <i>Serampur.</i>
1876 Dec. 6.	N.S.	Malleson, Col. G. B., C. S. I. <i>Europe.</i>
1878 April 3.	R.	Mallet, F. R., Geological Survey of India. <i>Calcutta.</i>
1864 July 6.	R.	Mallik, Devendra, Babu. <i>Calcutta.</i>
1869 Sept. 1.	R.	Mallik, Yadulal, Babu. <i>Calcutta.</i>
1872 Nov. 6.	N.R.	Man, E. H., Asst. Supdt. <i>Port Blair, Andamans.</i>
1877 Dec. 5.	N.R.	Mandelli, L. <i>Darjeeling.</i>

Date of Election.		
1869 July 7.	N.R.	Markham, Alexander Macaulay, c. s., Offg. Magistrate and Collector. <i>Allahabad.</i>
1873 July 2.	N.R.	Marshall, C. W. <i>Berhampur.</i>
1873 Aug. 6.	N.S.	Marshall, Lieut.-Col. William Elliot. <i>Europe.</i>
1877 Feb. 7.	R.	Marshall, Capt. Geo. Fred. Leycester, B. E., Offg. Asst. Secy., Govt. of India, P. W. D. <i>Calcutta.</i>
1876 Jan. 5.	N.R.	McGregor, W., Supdt. Telegraphs <i>Dhubri, Assam.</i>
1860 Mar. 7.	R.	Medlicott, H. B., M. A., F. R. S., F. G. S., Supdt. Geological Survey of India. <i>Calcutta.</i>
1877 Mar. 7.	R.	Medlycott, Adolphus Edwin, PH. D., The Rev. 3, <i>Cullen Place, Howrah.</i>
1871 Sept. 6.	N.R.	Miles, Lieut.-Colonel S. B., s. c., Political Agent. <i>Muskat.</i>
1870 July 6.	R.	Miller, A. B., B. A., Barrister at Law, Official Assignee. <i>Calcutta.</i>
1874 May 6.	N.R.	Minchin, F. J. V. <i>Aska, Ganjam.</i>
1875 Aug. 4.	N.S.	Minchin, Lieut.-Col. C. C., Political Agent and Supdt. Babawalpur State. <i>Europe.</i>
1856 Mar. 5.	R.	Mitra, Rájendralála, Bábu, Rái Bahádur, C. I. E., LL. D. <i>Calcutta.</i>
1876 Dec. 6.	N.R.	Mockler, Major E., Political Agent. <i>Gwadur.</i>
1874 July 1.	R.	Molesworth, G. L., c. E., Consulting Engineer to Govt. of India for State Railways. <i>Calcutta.</i>
1854 Dec. 6.	R.	Morris, The Hon'ble George Gordon, B. C. S., Judge, High Court. <i>Calcutta.</i>
1878 May 2.	R.	Moyle, J. C., Barrister at Law, High Court. <i>Calcutta.</i>
1864 Nov. 2.	N.R.	Mukerjea, Bhudeva, Bábu, Inspector of Schools. <i>Chinsurah.</i>
1854 Oct. 11.	N.S.	Muir, Sir William, K. C. S. I., B. C. S. <i>Europe.</i>
1867 Mar. 6.	R.	Mukerjea, Pearimohan, Bábu, M. A., Pleader, High Court. <i>Uttarpara.</i>
1862 July 2.	N.S.	Napier of Magdala, Baron, General, G. C. S. I., G. C. B. <i>Europe.</i>
1876 May 4.	R.	Nash, A. M., M. A., Professor, Presidency College. <i>Calcutta.</i>
1871 Jan. 4.	N.S.	Newton, Isaac. <i>Europe.</i>
1869 July 7.	N.R.	Nursing Rao, A. V. <i>Vizagapatam.</i>
1871 July 5.	N.R.	Oates, E. W., c. E., Engineer, P. W. D., Garrison Div., Sittang Canal. <i>Rangoon, Pegu.</i>
1874 Oct. 4.	R.	O'Kinealy, The Hon'ble James, c. s., District and Sessions Judge, 24-Pergannahs. <i>Calcutta.</i>
1873 Aug. 6.	N.R.	Olpherts, W. J., c. E., Resident Engr., E. I. Railway. <i>Benares.</i>
1873 Aug. 6.	R.	Parker, J. C., Custom House Agent. <i>Calcutta.</i>

Date of Election.		
1876 June 7.	R.	Parry, Robert, Professor, Presidency College. <i>Calcutta.</i>
1862 May 7.	L.M.	Partridge, Surgeon-Major Samuel Bowen, M. D. <i>Calcutta.</i>
1871 Dec. 6.	N.R.	Peal, S. E., Manager, Sapakati Tea Estate. <i>Sibsága Assam.</i>
1873 Aug. 6.	R.	Pedler, Alexander, Professor of Chemistry, Presidency College. <i>Calcutta.</i>
1864 Mar. 2.	N.R.	Pellow, Fleetwood Hugo, C. S., Offg. Commissioner. <i>Burdwan.</i>
1865 Sept. 6.	N.R.	Peppe, T. E. <i>Ranchi.</i>
1877 Aug. 1.	N.R.	Peters, C. T., M. B., Belgaum. <i>Bombay Presidency</i>
1868 May 6.	N.R.	Peterson, F. W., Bombay Mint. <i>Bombay.</i>
1835 July 1.	F.M.	Phayre, Lieut.-G., Sir Arthur Purves, K. C. S. I., C. <i>Mauritius.</i>
1875 Feb. 3.	N.R.	Porter, W. J., Asst. Supdt. of Police. <i>Mergui.</i>
1872 Dec. 4.	R.	Prannáth Sarasvati, Pandit, M. A., B. L. <i>Bhowanipet</i>
1878 Feb. 6.	R.	Prinsep, the Hon'ble, H. T., Judge of the High Court. <i>Calcutta.</i>
1874 Dec. 2.	N.R.	Protheroe, Capt. M., Deputy Supdt. <i>Port Blair.</i>
1878 Aug. 29.	N.R.	Rangoon, Right Rev., Bishop of. <i>Rangoon.</i>
1877 May 2.	R.	Ravenshaw, Thomas Edw., C. S., Commissioner Burdwan Division. <i>Calcutta.</i>
1868 April 1.	N.R.	Rái, Pramathanáth, Raja. <i>Digapati.</i>
1876 July 5.	F.M.	Raye, D. O'Connell, M. D., 1st Resdt. Surgeon, Presidency General Hospital. <i>Europe.</i>
1877 Aug. 1.	N.R.	Rees, J. C., Asst. Engr. P. W. D., Thayetmyo Division. <i>Prome, B. Burmah.</i>
1860 Mar. 7.	N.R.	Reid, Henry Stewart, C. S., Member, Board of Revenue N. W. P. <i>Allahabad.</i>
1871 July 5.	N.S.	Reid, James Robert, C. S. <i>Europe.</i>
1872 April 3.	R.	Richards, Dr. Vincent. <i>Calcutta.</i>
1860 Jan. 3.	N.R.	Rivett-Carnac, John Henry, C. I. E., C. S., Opium Agent. <i>Ghazipur.</i>
1868 April 1.	R.	Robb, Gordon. <i>Calcutta.</i>
1863 April 1.	N.R.	Robertson, Charles, C. S., Secretary to the Govt. N. W. P. and Oude. <i>Allahabad.</i>
1878 Sept. 25.	R.	Robertson, Rev. J., Principal, Doveton College. <i>Calcutta.</i>
1865 Feb. 1.	R.	Robinson, S. H. <i>Calcutta.</i>
1876 Dec. 6.	N.S.	Rodon, Lieut. G. S., Royal Scots. <i>Europe.</i>
1870 Jan. 5.	N.R.	Ross, Major Alexander George, Staff Corps, 2nd Comd., 1st Sikh Infy. <i>Dera Ghazi Khan, Panja</i>
1871 Dec. 6.	F.M.	Samuells, Major William Leycester, B. S. C. <i>Coate's Garden, Edinburgh.</i>
1877 May 2.	N.R.	Sandford, W., Assistant Traffic Manager, Nizam State Railway. <i>Secunderabad, Deccan.</i>

Date of Election.		
1878 Jan. 2.	R.	Sawyer, Capt., H. A., Military Department. <i>Calcutta.</i>
1870 May 4.	N.R.	Schlich, Dr. W. <i>Darjiling.</i>
1869 Feb. 3.	F.M.	Schwendler, L., Telegraph Store Department. <i>Europe.</i>
1876 July 5.	N.S.	Scott, Ross, c. s. <i>Europe.</i>
1874 July 1.	N.R.	Scully, Dr. John, Residency Surgeon. <i>Gilgit, Kashmir.</i>
1874 Dec. 2.	N.R.	Sen, Rám Dás, Bábu. <i>Berhampur.</i>
1876 Feb. 2.	N.R.	Shaw, R. B., Political Agent. <i>Mandalay.</i>
1878 May 2.	R.	Sharpe, C. J. <i>Calcutta.</i>
1878 April 3.	R.	Simson, A. <i>Calcutta.</i>
1876 April 5.	R.	Singh, Kumara Kantichandra. <i>Calcutta.</i>
1878 Oct. 4.	N.R.	Singh, Raja Lachman. <i>Bulandshahar.</i>
1869 Feb. 3.	N.R.	Singh, Giriprasád, Thákur. <i>Biswan Fort, Allighar.</i>
1853 Dec. 7.	N.R.	Singh, Isvaríprasád, Bahádur, Rájá. <i>Benares.</i>
1859 Aug. 3.	R.	Sinha, Balaichánd, Bábu. <i>Calcutta.</i>
1877 Aug. 30.	N.R.	Singha, Pratápanaráyan, Deputy Magt. <i>Jehanabad.</i>
1867 April 3.	R.	Sirkár, Mahendralál, Dr. <i>Calcutta.</i>
1872 Aug. 7.	N.R.	Skrefsrud, Rev. L. O., India Home Mission to the Santhals. <i>Dúmká, Santhal Purgunnahs.</i>
1864 Sept. 7.	N.R.	Sladen, Lieut.-Col. E. B., m. s. c., Commissioner, Arracan Division. <i>Arracan.</i>
1875 Feb. 3.	N.S.	Smidt, John. <i>Europe.</i>
1865 July 5.	R.	Smith, David Boyes, m. d., Medical College. <i>Calcutta.</i>
1874 June 3.	N.R.	Smith, Vincent Arthur, c. s., Asst. Settlement Officer. <i>Hamirpur, N. W. P.</i>
1878 Mar. 6.	R.	Souttar, W. M., Chairman of the Corporation. <i>Calcutta.</i>
1877 April 4.	N.R.	Spens, A. N. W., The Rev., Chaplain. <i>Sialkot.</i>
1872 July 3.	N.R.	Stephen, Carr, B. L., Judl. Asst. Commr. <i>Ludianah.</i>
1875 July 7.	R.	Stewart, M. G. <i>Calcutta.</i>
1876 Aug. 2.	N.R.	St. John, Major Oliver Beauchamp, R. E., Frontier Expeditionary Force. <i>Quettah Column.</i>
1861 Sept. 4.	R.	Stokes, The Hon'ble Whitley, c. s. I., c. I. E. <i>Calcutta.</i>
1869 Feb. 3.	R.	Strachey, The Hon'ble Sir J., K.C.S.I., C.I.E. <i>Calcutta.</i>
1859 Mar. 2.	N.R.	Stubbs, Lieut.-Col. Francis William, Royal Artillery. <i>Lucknow.</i>
1858 July 7.	N.R.	Sutherland, Henry Cobbe, M. A., B. C. S., Dist. and Sess. Judge. <i>Backergunge.</i>
1864 Aug. 11.	R.	Swinhoe, W., Attorney-at-Law. <i>Calcutta.</i>
1871 Mar. 1.	R.	Tagore, Dvijendranath, Bábu. <i>Calcutta.</i>
1871 Jan. 4.	R.	Tagore, Gunendranath, Bábu. <i>Calcutta.</i>
1868 June 3.	R.	Tagore, Jotendra Mohun, The Hon'ble, Maharaja. <i>Calcutta.</i>
1865 Sept. 6.	R.	Tawney, C. H., M. A., Principal, Presidency College. <i>Calcutta.</i>
1865 April 5.	N.S.	Taylor, R., c. s. <i>Europe.</i>
1874 Mar. 4.	R.	Taylor, Commander A. D., late Indian Navy. <i>Calcutta.</i>

Date of Election.		
1860 May 2.	N.R.	Temple, The Hon. Sir R., Bart., K.C.S.I., C.I.E., B.C.S. <i>Bombay.</i>
1878 June 5.	N.R.	Temple, Lieut. R. C. <i>Dharamsala.</i>
1876 Feb. 2.	R.	Tennant, Col. James Francis, R. E., F. R. S., C. I. E., Mint Master. <i>Calcutta.</i>
1875 June 2.	N.R.	Thibaut, Dr. G., Prof. Sanskrit College. <i>Benares.</i>
1869 Oct. 6.	N.R.	Thomson, A., Inspector of Schools. <i>Faizabad.</i>
1875 Nov. 3.	N.R.	Thomson, Robert George, c. s., Asst. Commr. <i>Karnal, Panjab.</i>
1847 June 2.	L.M.	Thuillier, Major-Genl., Henry Edward Landor, R. A., C. S. I., F. R. S. <i>Care of Messrs. Grindlay and Co., 55, Parliament St., London.</i>
1865 July 5.	N.S.	Tolbort, Thos. Wm. Hooper, c. s., Offg. Deputy Commissioner. <i>Gujranwala.</i>
1871 April 5.	F.M.	Treffitz, Oscar. <i>Care of Messrs. E. D. Keilhorn and Co., 16, St. Mary Axe, London.</i>
1861 June 5.	L.M.	Tremlett, James Dyer, M. A., c. s. <i>Europe.</i>
1872 July 3.	N.R.	Trevor, William Spottiswoode, Lieut.-Col., R. E. <i>Europe.</i>
1873 April 6.	R.	Turnbull, Robert, Secretary to the Corporation. <i>Calcutta.</i>
1863 May 6.	N.R.	Tyler, J. W., M. D., F. R. C. S., Supdt. Central Prison. <i>Agra.</i>
1864 April 6.	N.R.	Vijayarāma Gujapati Raj Munniā Sultan Bahādūr, Mahārājah Mirza Vijayanagram. <i>Benares.</i>
1869 Aug. 4.	R.	Wáhid Ali, Prince Jahán Qadr Muhammad, Bahádūr. <i>Garden Reach.</i>
1865 Nov. 1.	R.	Waldie, David, F. G. S. <i>Calcutta.</i>
1861 May 1.	R.	Walker, Major-Genl. James T., R. E., C. B., F. R. S., Surveyor General of India. <i>Calcutta.</i>
1875 April 7.	N.R.	Wall, Dr. Alfred John, Residency Surgeon. <i>Katmandu, Nepal.</i>
1863 Oct. 7.	R.	Waller, Walter Kerr, M. B. <i>Calcutta.</i>
1865 May 8.	R.	Waterhouse, Capt. James, B. S. C., Asst. Surveyor General. <i>Calcutta.</i>
1874 July 1.	N.R.	Watt, Dr. George, Professor, Hughli College. <i>Ohinsurah.</i>
1876 Dec. 6.	N.S.	Webb, W. T., M. A., Prof. Dacca College. <i>Europe.</i>
1869 Sept. 1.	R.	Westland, James, c. s., Accountant General. <i>Calcutta.</i>
1867 Feb. 6.	N.S.	Westmacott, Edward Vesey, B. A., c. s. <i>Europe.</i>
1862 Oct. 8.	R.	Wheeler, James Talboys. <i>Calcutta.</i>
1878 Aug. 29.	N.R.	Wheeler, P. C., c. s., Asst. Magistrate. <i>Ghazipur.</i>
1873 April 2.	N.R.	White, Edmond, c. s., Offg. Joint Magistrate and Collector. <i>Allahabad.</i>
1878 Sept. 25.	R.	White, The Hon'ble J. Sewell, Judge, High Court. <i>Calcutta.</i>

Date of Election.		
1875 Feb. 3.	N.R.	Whiteway, Richard Stephen, c. s., Asst. Settlement Officer. <i>Muttra.</i>
1877 April 4.	N.R.	Whitty, Irvine John, Supdt., Khurhurbari Collieries. <i>Giridhi, E I. Railway.</i>
1878 Aug. 29.	N.R.	Whittall, R., Forest Dept. <i>British Burmah.</i>
1867 Aug. 7.	N.R.	Wilcox, F., Dist. Supdt. of Police. <i>Purulia, Manbhumi.</i>
1873 May 7.	N.R.	Williams, George Robert Carlisle, B. A., c. s., Offg. Joint Magt. and Collr. in charge of Ballia. <i>Ghazipur.</i>
1867 Jan. 16.	N.R.	Williamson, Capt. William John, Offg. Inspr. Genl. of Police and Supdt. of Stamps. <i>Garo Hills, Assam.</i>
1876 April 5.	R.	Wilson, Alexander. <i>Calcutta.</i>
1870 Aug. 3.	N.R.	Wilson, Robert Henry, B. A., c. s., Magt. and Collr. <i>Midnapore.</i>
1878 Mar. 6.	N.R.	Wilson, J. <i>Gurgaon, Punjab.</i>
1866 Mar. 7.	L.M.	Wise, Dr. J. F. N. <i>Rostellan, County Cork. Ireland.</i>
1867 July 3.	N.R.	Wood, Dr. Julius John, Supdt. of Vaccination. <i>Ranchi.</i>
1874 Mar. 4.	R.	Wood, C. H. <i>Calcutta.</i>
1870 Jan. 5.	F.M.	Wood-Mason, James. <i>Care of Messrs. King and Co., 65, Cornhill. London.</i>
1873 Aug. 6.	N.R.	Woodthorpe, Capt. Robert Gossett, B. E., Asst. Supdt. Survey of India. <i>Frontier Expeditionary Force. Kurn Valley Column.</i>

HONORARY MEMBERS.

1821 Mar. 6.	Sir John Phillippart. <i>London.</i>
1826 July 1.	Count de Noe. <i>Paris.</i>
1835 May 6.	Professor Isaac Lea. <i>Philadelphia.</i>
1847 Sept. 1.	Col. W. Munro. <i>London.</i>
1847 Nov. 8.	His Highness the Nawab Nazim of Bengal. <i>Murshidabad.</i>
1848 Feb. 2.	Dr. J. D. Hooker, B. N., F. R. S. <i>Kew.</i>
1848 Mar. 8.	Professor Henry. <i>Princeton, U. S.</i>
1853 April 6.	Major-Gen. Sir H. C. Rawlinson, K. C. B. <i>London.</i>
1858 July 6.	B. H. Hodgson. <i>Europe.</i>
1859 Mar. 2.	The Hon'ble Sir J. W. Colvile, Kt. <i>Europe.</i>
1860 „ 7.	Professor Max Müller. <i>Oxford.</i>
1860 Nov. 7.	Monsieur Stanislas Julien. <i>Paris.</i>
1860 „ 7.	Edward Thomas. <i>London.</i>
1860 „ 7.	Dr. Aloys Sprenger. <i>Bern.</i>
1860 „ 7.	Dr. Albrecht Weber. <i>Berlin.</i>
1868 Feb. 5.	General A. Cunningham, c. s. i. <i>India.</i>

1868 Feb. 5.	Professor Bápu Déva Sástri. <i>Benares.</i>
1868 „ 2.	A. Grote. <i>London.</i>
1871 „ 7.	Charles Darwin. <i>London.</i>
1872 „ 1.	Sir G. B. Airy. <i>London.</i>
1872 June 5.	Professor T. H. Huxley. <i>London.</i>
1875 Nov. 3.	Dr. O. Böhtlingk. <i>Jena.</i>
1875 „ 3.	Professor J. O. Westwood. <i>Oxford.</i>
1876 April 5.	Col. H. Yule, R. E., C. B. <i>London.</i>
1876 „ 5.	Dr. Werner Siemens. <i>Berlin.</i>
1877 Jan. 17.	Dr. John Muir. <i>Edinburgh.</i>

CORRESPONDING MEMBERS.

1844 Oct. 2.	Macgowan, Dr. J. <i>Europe.</i>
1856 June 4.	Krämer, Herr A. von. <i>Alexandria.</i>
1856 „ 3.	Porter, Rev. J. <i>Damascus.</i>
1856 „ 4.	Schlagintweit, Herr H. von. <i>Munich.</i>
1856 „ 4.	Smith, Dr. E. <i>Beyrout.</i>
1859 „ 4.	Tailor, J., Esq. <i>Bussorah.</i>
1857 Mar. 4.	Nietner, J., Esq. <i>Ceylon.</i>
1858 „ 3.	Schlagintweit, Herr R. von. <i>Giessen.</i>
1859 Nov. 2.	Frederick, Dr. H. <i>Batavia.</i>
1860 Feb. 1.	Baker, The Rev. H. <i>E. Malabar.</i>
1861 July 3.	Gösche, Dr. R.
1862 Mar. 3.	Murray, A., Esq. <i>London.</i>
1863 July 4.	Barnes, R. H., Esq. <i>Ceylon.</i>
1866 May 7.	Schlagintweit, Prof. E. von. <i>Munich.</i>
1866 „ 7.	Sherring, Rev. M. A. <i>Benares.</i>
1868 „ 5.	Holmböe, Prof. <i>Christiania.</i>

ASSOCIATE MEMBERS.

1865 May 3.	Dall, Rev. C. H. <i>Calcutta.</i>
1874 Feb. 4.	Schaumburgh, J., Esq. <i>Calcutta.</i>
1874 April 1.	Lafont, Rev. F. E., s. J. <i>Europe.</i>
1875 Dec. 1.	Bate, Rev. J. D. <i>Allahabad.</i>
1875 „ 1.	Maulawí Abdul Hai, Madrasah. <i>Calcutta.</i>

LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

**Rule 40.*—After the lapse of 3 years from the date of a Member leaving India, if no intimation of his wishes shall in the interval have been received by the Society, his name shall be removed from the list of Members.

The following Members will be removed from the next Member List of the Society under the operation of the above Rule.

Surgeon-Major J. Ewart,	1876.
Lt.-Col. J. G. R. Forlong,	1874.
G. W. Hoyle, Esq.,	1873.
Dr. W. W. Hunter,	1875.
Col. H. Hyde,	1876.
Sir W. Muir,	1876.
Lord Napier of Magdala,	1876.
Isaac Newton, Esq.,	1873.

LOSS OF MEMBERS DURING 1878.

BY RETIREMENT.

J. Behrendt, Esq. *Patna.*
 Capt. S. H. Cowan. *Calcutta.*
 Sir R. H. Davies. *Europe.*
 Major-Genl. C. Douglas. *Lucknow.*
 C. A. Elliot, Esq. *Madras.*
 J. M. Foster, Esq. *Assam.*
 Capt. E. A. Fraser. *Bussorah, Persian Gulf.*
 Capt. H. C. Marsh. *Europe.*
 Surgeon-Major W. J. Palmer. *Calcutta.*
 C. E. Pearson, Esq. *Rawul Pindee.*
 Sir J. B. Phear. *Ceylon.*

BY DEATH.

Ordinary Members.

A. Anderson, Esq. *Europe.*
 H. Blochmann, Esq. *Calcutta.*
 P. T. Carnegy, Esq. *Assam.*
 T. Chennell, Esq. *Assam.*
 Dr. E. J. Gayer. *Calcutta.*
 C. Heintze, Esq. *Calcutta.*
 S. Kurz, Esq. *Calcutta.*
 Dr. T. Oldham. *Europe.*
 Dr. A. M. Verchère. *Agra.*

Honorary Members.

M. Garcin de Tassy. *Paris.*
 Dr. T. Thomson. *London.*

Corresponding Member.

Bleeker, Dr. H. *Europe.*

BY REMOVAL.

Under Rule 38.

N. A. Belletty, Esq. *Calcutta.*
 W. G. Bligh, Esq. *Agra.*
 Pandit Chandra Mohun Gosvami. *Gauhati.*
 Capt. T. St. Quintin Clutterbuck. *Amritsar.*
 J. E. Cooke, Esq. *Calcutta.*
 Babu Gurucharan Dás. *Krishnagar.*
 Surgeon-Major F. W. A. DeFabeck. *Deoli.*
 R. Forest, Esq., c. E. *Dehra.*
 Maulavi Habiburrahman. *Calcutta.*
 R. T. Hobart, Esq., c. s. *Allahabad.*
 M. Kempson, Esq., M. A. *Allahabad.*
 Capt. H. W. King.
 J. C. Leupolt, Esq., c. s. *Etah.*
 Babu Yogendronath Mallik. *Andul.*
 Babu Niranjana Mukerjee. *Benares.*
 Sashagiri M. Sastri, B. A. *Madras.*
 G. Shelverton, Esq. *Waltair, near Vizagapatam.*
 Major-Gen. C. L. Showers. *Amballa.*
 Major H. R. Spearman. *Rangoon, B. Burmah.*
 R. D. Stewart, Esq. *Raniganj.*

Under Rule 40.

Lt.-Col. A. S. Allan.
 G. W. W. Barclay, Esq.
 Sir G. Campbell.
 Sir W. Elliot.
 Sir J. Fayrer.
 Sir T. D. Forsyth.
 Col. J. C. Haughton.
 H. Leonard, Esq.
 Dr. C. Macnamara.
 Lt.-Col. G. G. Pearse.
 Dr. W. Waagen.

[APPENDIX.]

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENTS
OF THE
ASIATIC SOCIETY OF BENGAL
FOR
THE YEAR 1878.

STATEMENT, *Abstract of the Cash Account*

RECEIPTS.			1878.	1877.
BALANCE OF 1877.				
In the Bank of Bengal, viz.				
Account of Stoliczka Memorial Fund,	329 11 2			
Account of Dr. Oldham Memorial Fund,	2 6 3			
Account of Piddington Pension Fund,	98 2 0			
Account of Asiatic Society of Bengal,	2,537 14 8			
	<u>2,968 2 1</u>			
Cash in hand,	156 14 7			
	<u>3,125 0 8</u>		3,125 0 8	3,968 1 0
ADMISSION FEES.				
Received from Members,	976 0 0			
	<u>976 0 0</u>		976 0 0	880 0 0
SUBSCRIPTIONS.				
Received from Members,	7,006 0 0			
	<u>7,006 0 0</u>		7,006 0 0	7,200 2 0
COMMUTED SUBSCRIPTIONS.				
Received from Members,	100 0 0			
	<u>100 0 0</u>		100 0 0	770 0 0
PUBLICATIONS.				
Sale proceeds of Journal and Proceedings,	378 0 0			
Subscription to ditto,	957 12 0			
Refund of postage stamps,	4 9 0			
	<u>1,340 5 0</u>		1,340 5 0	1,633 5 0
LIBRARY.				
Sale proceeds of books,	266 0 0			
Refund of postage stamps,	4 11 0			
	<u>270 11 0</u>		270 11 0	227 5 0
FINES AND COMMISSIONS.				
Fines, &c.,	38 11 3			
Commission on purchase of Stamps,	4 0 6			
	<u>42 11 9</u>		42 11 9	47 7 9
CONTINGENT CHARGES.				
Sale proceeds of book-cases, almirahs, tables, benches, &c.,	539 0 0			
Ditto ditto a lot of bricks,	65 0 0			
Refund of packing charges,	14 6 9			
	<u>618 6 9</u>		618 6 9	21 8 0
VESTED FUND.				
Sale proceeds of 5½ % Government Securities, 1,000 0 0				
Interest on ditto ditto,	5 8 0			
Premium on ditto ditto,	40 0 0			
	<u>1,045 8 0</u>		1,045 8 0	17,501 0 11
Carried over, Rs. ..			14,524 11	232,248 13 8

No. 1.

of the Asiatic Society for 1878.

DISBURSEMENTS.		1878.			1877.		
PUBLICATIONS.							
Paid freight for sending Journal and Proceedings to England,	117 10 6						
Ditto Lithographing and Engraving charges, &c.,	1,498 1 3						
Ditto Printing charges,	4,733 8 11						
Ditto Commission on Collecting Bills, ..	1 13 6						
Ditto Purchase of Postage Stamps, ..	180 2 0						
Ditto Packing charges,	22 2 0						
Ditto Paper for Plates,	100 10 9						
Ditto overland carriage on parcels of lithographed plates from England, ..	23 8 9						
Ditto Petty charges,	7 7 3						
Ditto for a Copper Plate inscription, ..	40 0 0						
Ditto A. Grote, Esq., in advance for publication charges of Mr. Moore's Papers on Lepidoptera, £80,	928 1 6						
		7,652 13 5	8,194 15 6				
LIBRARY.							
Paid Commission on Collecting Bills, ..	0 7 0						
Ditto Landing charges,	17 14 9						
Ditto Book Binding charges,	303 5 0						
Ditto Salary of Punkah bearer,	82 2 3						
Ditto Subscription to the Calcutta Review, ..	12 0 0						
Ditto Ditto to the Medical Gazette, ..	15 0 0						
Ditto Ditto to Stray Feathers,	22 0 0						
Ditto Ditto to Vyakarana Mohabhashya, ..	8 10 6						
Ditto Ditto to Bengal Directory,	14 0 0						
Ditto purchase of books through Messrs. Trübner and Co.,	944 4 6						
Ditto Ditto through Bernard Quaritch, ..	164 12 6						
Ditto Ditto through Messrs. L. Reeve and Co.,	74 10 0						
Ditto Ditto through Robert Brandt,	20 7 3						
Ditto Ditto in Calcutta,	336 13 6						
Ditto Salary for Cataloguing Library books, ..	420 0 0						
Ditto Ditto for Persian Library books, ..	210 0 0						
Ditto Ditto for Mr. Hodgson's Nepalese MSS. ..	240 0 0						
Ditto Ditto for numbering Library books, ..	47 0 0						
Ditto Ditto for fair Copying the Library Catalogue,	243 0 0						
Ditto Ditto for sorting and arranging ditto ditto,	434 0 0						
Ditto for Kheroah Cloth for Sanskrit MSS., ..	114 14 0						
Ditto Tape for ditto,	4 0 0						
Ditto Paste-board for Sanskrit MSS., ..	24 13 6						
Ditto Insufficient and Bearing postage, ..	46 11 6						
Ditto Petty charges,	8 8 0						
		3,809 6 3	4,372 0 9				
Carried over, Rs. ..		11,462 3 8	12,567 0 2				

XX

RECEIPTS.		1878.			1877.		
Brought over, Rs. ..		14,524	11	2	32,248	13	8
INTEREST ON VESTED FUND.							
Received from the Bank of Bengal on account of Government Securities, ..	..	10,226	1	5			
		<u>10,226</u>	1	5	7,583	0	0
DR. STOLICZKA MEMORIAL FUND.							
Received by transfer of the amount paid by A. Grote, Esq. of London, through Messrs. Trübner & Co., £2-0-8d, being the balance of Dr. Stoliczka Memorial Fund, ..	..	20	5	4			
		<u>20</u>	5	4	16	0	0
DR. OLDHAM MEMORIAL FUND.							
Received by transfer of the amount paid by Dr. G. E. Dobson of London, through Messrs. Trübner & Co., £3-3-0, being the balance of Dr. Oldham Memorial Fund, ..	..	31	8	0			
Ditto Subscriptions to the Fund, ..	..	132	0	0			
		<u>163</u>	8	0	1,068	0	0
BLOCHMANN MEMORIAL FUND.							
Received Subscriptions to the Fund, ..	..	454	6	0			
		<u>454</u>	6	0	0	0	0
PIDDINGTON PENSION FUND.							
Received interest on Government Security for Rs. 500, ..	..	39	0	6			
		<u>39</u>	0	6	27	8	0
CONVERSAZIONE.							
Received Subscriptions, ..	..	255	15	0			
		<u>255</u>	15	0	0	0	0
Borrowed from O. P. Fund, ..	..	2,000	0	0			
Conservation of Sanskrit MSS. ..	..	6	6	0			
Refund of Postage and Miscellaneous, ..	..	957	9	10	1,033	11	0

Carried over, Rs. .. 28,647 15 3 41,977 0 8

DISBURSEMENTS.			1878.			1877.		
Brought over, Rs. ..			11,462	3	8	12,567	0	2
ESTABLISHMENT.								
Paid Establishment, ..	..	..	3,817	8	0	3,817	8	0
						3,991	0	0
CONTINGENT CHARGES.								
Paid Commission on Subscriptions collected, ..	..	..	45	4	9			
Ditto Purchase of Postage Stamps, ..	..	..	141	7	0			
Ditto Insufficient and Bearing postage, ..	..	..	1	12	0			
Ditto Meeting charges, ..	..	..	213	10	6			
Ditto Advertising charges, ..	..	..	77	4	0			
Ditto Printing charges, ..	..	..	222	0	0			
Ditto pension to Islam Khan, ..	..	..	36	0	0			
Ditto fee for Stamping Cheques, ..	..	..	3	2	0			
Ditto Stationery, ..	..	..	245	5	3			
Ditto Binding Letter Files, ..	..	..	23	12	0			
Ditto Salary of Punkah Bearer, ..	..	..	38	8	0			
Ditto Subscription to the Army List, ..	..	..	16	0	0			
Ditto carpenters for the Book Shelves, ..	..	..	11	2	0			
Ditto Petty charges, ..	..	..	111	5	10			
Ditto Ticca Coolies for bringing Glass Cases from New Museum building, ..	..	..	14	7	9			
						1,201	1	1
						1,452	15	8
FURNITURE AND FITTINGS.								
Paid for two Teakwood large Glass Cases, ..	..	..	435	11	0			
Ditto Ditto a writing table, ..	..	..	25	4	0			
Ditto for polishing, repairing locks and numbering 31 Glass Cases, ..	..	..	150	0	0			
Ditto cane matting for upstairs, ..	..	..	3	14	0			
Ditto repairing and polishing frames, ..	..	..	6	0	0			
						620	13	0
						8,125	15	6
VESTED FUND.								
Paid Commission on Selling Government Security for Rs. 1,000, ..	..	..	2	10	10			
Ditto Brokerage on ditto ditto, ..	..	..	1	4	0			
						3	14	10
						78	8	1
Paid Commission on collecting interest on Government Securities, ..	..	..	25	8	10			
						25	8	10
						18	15	2
BUILDING.								
Paid for cleaning and relaying drain pipes, ..	..	..	11	4	0			
						11	4	0
						7,569	13	6
TAXES.								
Paid Police and Lighting rates, ..	..	..	204	0	0			
Ditto House rate, ..	..	..	408	0	0			
Ditto Water rate, ..	..	..	168	0	0			
						780	0	0
						750	0	0
COIN FUND.								
Purchase of 1 Gold Coin, ..	..	..	40	0	0			
Ditto Silver Coins, ..	..	..	16	8	0			
Ditto 41 Copper Coins, ..	..	..	3	0	6			
						59	8	6
						221	10	0
Carried over, Rs. ..						17,981	13	11
						34,775	14	1

RECEIPTS.	1878.	1877.
Brought over, Rs. ..	28,647 15 3	41,977 0 8

Total Rs. .. 28,647 15 3 41,977 0 8

Errors and Omissions Excepted.

KEDAR NATH BYSACK,
Cashier, Asiatic Society.

Examined and checked against the account.

J. WESTLAND.
R. LYDEKKER.

ASIATIC SOCIETY'S Rooms,
Calcutta, 1st Jan., 1879.

DISBURSEMENTS. 1878. 1877.

Brought over, Rs. .. 17,981 13 11 34,775 14 1

DR. OLDHAM MEMORIAL FUND.

Paid Landing charges, wharf rent, cooley, &c., on 3 Cases of marble busts and pedestals, ..	12 12 9				
	<hr/>	12 12 9	1,196	1	9

DR. STOLICZKA MEMORIAL FUND.

Paid freight and Landing charges, &c., on 3 Cases of marble busts and pedestals, ..	69 1 0				
Ditto Postage for sending Photographs to Subscribers,	2 8 6				
Ditto Printing charges,	5 0 0				
	<hr/>	76 9 6	20	15	3

PIDDINGTON PENSION FUND.

Paid Commission on Collecting interest on Government Security,	0 1 7				
	<hr/>	0 1 7	0	1	2

BLOCHMANN MEMORIAL FUND.

Paid Printing charges, 400 copies of Circular, Ditto Advertising the list of Subscribers to the Fund,	18 4 0 106 0 0				
	<hr/>	124 4 0	0	0	0

COPYING MSS.

Paid for Copying charges,	41 0 0				
	<hr/>	41 0 0	0	0	0

CONVERSAZIONE.

Paid for refreshment, &c.,	225 0 0				
Ditto Printing charges for notices and Cards,	9 6 6				
Ditto Advertising charges,	2 4 0				
Ditto Petty charges,	19 6 0				
	<hr/>	256 0 6	0	0	0

Repaid to O. P. Fund,	2,000 0 0				
Loan to Conservation of Sanscrit Manuscripts,	6 6 0				
Postage and Miscellaneous,	932 4 6				
	<hr/>	2,938 10 6			

BALANCE.

In the Bank of Bengal, viz.					
Account of Stoliczka Memorial Fund,	273 7 0				
Account of Dr. Oldham Memo- rial Fund,	153 1 6				
Account of Blochmann Memo- rial Fund,	330 2 0				
Account of Piddington Pension Fund,	137 0 11				
Account of Asiatic Society of Bengal,	6,265 14 11				
	<hr/>	7,159 10 4			
Cash in hand,	57 0 2				
	<hr/>	7,216 10 6	3,125	0	8

Total, Rs., .. 28,647 15 3 39,118 0 11

Errors and Omissions Excepted.

KEDAR NATH BYSACK,
Cashier, Asiatic Society.

Examined and checked against the account.

J. WESTLAND.

R. LYDEKKER.

ASIATIC SOCIETY'S ROOMS,
Calcutta, 1st Jan., 1879.

STATEMENT, *Abstract of the Cash Account,*

	RECEIPTS.	1878.	1877.
BALANCE OF 1877.			
In the Bank of Bengal, viz.			
Dr. J. Muir's account, ..	898 10 0		
The Government, N. W. P., for Beal's Oriental Dictionary ac- count, ..	1,500 0 0		
O. P. Fund account, ..	129 7 1		
	<hr/>	2,528 1 1	
Cash in hand, ..		200 9 6	
		<hr/>	2,728 10 7 3,153 3 2
ORIENTAL PUBLICATIONS.			
Received by sale of Bibliotheca Indica and by Subscription to ditto, ..	2,708 8 0		
Ditto Refund of postage and packing charges, ..	42 4 8		
Ditto Commission on Postage Stamps, ..	0 3 9		
	<hr/>	2,751 0 5	2,379 2 3
GOVERNMENT ALLOWANCE.			
Received from General Treasury at 500 Rs. per month, ..	6,000 0 0		
Ditto ditto additional grant for the Publica- tion of Sanskrit Works, at 250 Rs. per month, ..	3,000 0 0		
	<hr/>	9,000 0 0	9,000 0 0
CUSTODY OF ORIENTAL WORKS.			
Received fines, &c., ..	12 3 9		
	<hr/>	12 3 9	8 8 0
Asiatic Society of Bengal, ..	2,000 0 0		
Messrs. Brajbhushana Dass and Co., ..	42 0 6		
Prof. E. B. Cowell, ..	66 12 0		
Pandita Rangacharjya, ..	3 0 0		
Pandita Jaistharam Mukundjee, ..	19 5 9		
Babu Jadubindo Bysack, ..	30 5 6		
	<hr/>	2,161 7 9	2,553 9 3

Carried over, Rs., .. 16,653 6 6 17,094 6 8

No. 2.

Oriental Publication Fund, 1878.

DISBURSEMENTS.			1878.	1877.
ORIENTAL PUBLICATIONS.				
Paid for Advertising charges, ..	..	170 0 0		
Ditto Postage Stamps, ..	..	72 2 6		
Ditto Freight for sending books, ..	..	74 2 0		
Ditto Commission on collecting bills, ..	..	1 15 6		
Ditto Coolies for removing books and shelves, ..	..	17 13 0		
Ditto by transfer of Bibliotheca Indica to Bernard Quaritch, Esq., ..	..	20 0 0		
Ditto Petty Charges, ..	..	10 15 8		
			367 0 8	638 1 9
CUSTODY OF ORIENTAL WORKS.				
Paid Salary of the Librarian, ..	..	510 0 0		
Ditto Establishment, ..	..	729 0 0		
Ditto Fee for stamping Cheques, ..	..	3 2 0		
Ditto Book-binding charges, ..	..	45 8 0		
			1,287 10 0	1,334 6 0
CATALOGUE OF SANSKRIT MSS.				
Paid Salary for Cataloguing Sanskrit MSS., ..	..	480 0 0		
			480 0 0	480 0 0
GOBHILYA GRINYA SUTRA.				
Paid Editing charges, ..	..	524 0 0		
Ditto Postage Stamps, ..	..	1 2 0		
			525 2 0	1 0 0
AIN I AKBARI.				
Paid Editing and Printing charges, ..	..	800 8 0		
Ditto Lithographing and Printing charges, ..	..	48 8 0		
			849 0 0	1,332 4 0
SAMAVEDA SAMHITA.				
Paid Editing and Printing charges, ..	..	819 0 0		
			819 0 0	3,281 9 0
BIOGRAPHICAL DICTIONARY.				
Paid Editing and Printing charges, ..	..	356 0 0		
			356 0 0	364 4 0
CHATURVARGA CHINTAMONI.				
Paid Editing and Printing charges, ..	..	2,150 8 3		
			2,150 8 3	1,845 11 0
BHÁMATI.				
Paid Printing charges, ..	..	166 0 0		
Ditto Freight, ..	..	5 13 6		
			171 13 6	0 0 0
AGNIPURANA.				
Paid Editing and Printing charges, ..	..	1,064 7 0		
			1,064 7 0	735 10 0
Carried over, Rs., ..			8,070 9 5	10,012 13 9

	1878.		1877.		
Brought over, Rs., ..	16,653	6 6	17,094	6 8	

Total, Rs., ..	16,653	6 6	17,094	6 8
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Errors and Omissions Excepted.

KADER NATH BYSACK,
Cashier, *Asiatic Society*.

Examined and checked against the account.

J. WESTLAND.
R. LYDEKKER.

ASIATIC SOCIETY'S ROOMS,
Calcutta, 1st Jan., 1879.

			1878.		1877.			
	Brought over, Rs., ..	8,070	9	5	10,012	13	9	
LALITA VISTARA.								
Paid Editing and Printing charges,	..	438 0 3	438	0	3	0	0	0
TAITTIRIYA SANHITA.								
Paid Editing charges,	..	96 0 0	96	0	0	0	0	0
KATANTRA.								
Paid Printing charges,	..	927 12 4	927	12	4	0	0	0
PRITHIRAJ RASU.								
Paid Editing charges,	..	144 0 0	144	0	0	0	0	0
The Government, N. W. P., for Beal's Oriental Dictionary,								
Paid Editing charges,	..	450 0 0						
Ditto Postage Stamps,	..	10 0 0	460	0	0	0	0	0
SANDILYÁ SUTRÁ.								
Paid Printing charges,	..	497 2 0	497	2	0	0	0	0
Loan to Asiatic Society of Bengal,	..	2,000 0 0						
Messrs. Brajbhushana Dass and Co.,	..	3 3 6						
Babu Mehr Chand,	..	0 6 0						
Babu Jadubindo Bysack,	..	71 14 0						
Pandita Rangacharjya,	..	3 0 0						
Pandita Jaistharam Mukundjee,	..	19 5 9						
Rev. T. Foulkes,	..	0 6 1						
Prof. E. B. Cowell,	..	71 12 0						
G. V. Chinatombi, Esq.,	..	1 12 2	2,171	11	6	34	13	3
BALANCE.								
In the Bank of Bengal, viz.								
Dr. J. Muir's account,	..	898 10 0						
The Government, N. W. P., for Beal's Oriental Dictionary account,								
O. P. Fund account,	..	1,040 0 0						
	..	1,886 2 3						
		3,824 12 3						
Cash in hand,	..	23 6 9	3,849	3	0	2,728	10	7
Total, Rs., ..								
			16,653	6	6	12,776	5	7

Errors and Omissions Excepted.

KADER NATH BYSACK,
Cashier, Asiatic Society.

Examined and checked against the account.

J. WESTLAND.
R. LYDEKKER.ASIATIC SOCIETY'S ROOMS,
Calcutta, 1st Jan., 1879.

STATEMENT

Conservation of Sanskrit MSS. Fund in Account

Cr.				
BALANCE OF 1877.				1878.
In the Bank of Bengal,	312	0	2	
Cash in hand,	37	0	0	
	<hr/>			349 0 2
Received from the Government of Bengal, the amount sanctioned towards the Conservation of Sanskrit MSS., being 2nd half of 1877-78,	1,600	0	0	
Ditto ditto 1st half of 1878-79,	1,600	0	0	
Sale proceeds of 35 copies, Notices of Sanskrit MSS.,	35	0	0	
Refund of Postage Stamps,	0	3	0	
Refund from Dr. Rájendralála Mitra, of the amount paid on the 21st March 1878 for purchase of Sanskrit MSS.,	200	0	0	
Ditto from ditto ditto paid on the 9th August, 1st and 14th September, 1877, for purchase of Sanskrit MSS.,	2,400	0	0	
Received from Asiatic Society of Bengal,	6	6	0	
	<hr/>			5,841 9 0

Total, Rs. 6,190 9 2

Examined and checked against the account.

J. WESTLAND.
R. LYDEKKER.

ASIATIC SOCIETY'S ROOMS.
Calcutta, 1st Jan., 1879.

NO. 3.

Current with the Asiatic Society of Bengal.

Dr.	1878.		
Paid Salary for preparing Catalogue of Sanskrit MSS.,.....	360	0	0
Ditto ditto for translating ditto,.....	240	0	0
Ditto ditto for travelling Pandit,	562	8	0
Ditto Contingent charges for travelling Pandit,	23	2	0
Ditto Travelling Allowance for ditto ditto,	354	15	0
Ditto Purchase of Sanskrit MSS.,	269	15	0
Ditto Paste-board for ditto,.....	59	4	9
Ditto Kheroah cloth for ditto,.....	67	10	0
Ditto Tape for ditto,.....	6	2	0
Ditto Dr. Rájendralála Mitra, as an advance for purchase of Sanskrit MSS.,	700	0	0
Ditto Librarian, his salary from May 1877 to April 1878,..	150	0	0
Ditto Salary for bearer,	84	0	0
Ditto Postage Stamps,	24	7	6
Ditto Freight for Sanskrit MSS.,	19	1	0
Ditto Dr. Rájendralála Mitra for copying and purchase of 445 copies of Sanskrit MSS.,.....	2,285	10	0
Ditto travelling expenses for ditto ditto in search of Sanskrit MSS. from Gaya to Arrah, Dumraon and Patna, includ- ing carriage hire and sundries,	175	10	0
Ditto Railway freight, packing charges, cart and cooleys, telegraphic messages,	37	7	0
Ditto Petty Charges,	5	13	6
Ditto Asiatic Society of Bengal,.....	6	6	0
	<hr/> 5,431 15 9		
BALANCE OF 1878.			
In the Bank of Bengal,	589	5	2
Cash in hand,	169	4	3
	<hr/> 758 9 5		

Total, Rs. 6,190 9 2

Errors and Omissions Excepted

KEDAR NATH BYSACK,
Cashier, Asiatic Society.

STATEMENT NO. 4.

Shewing the Assets and Liabilities of the Asiatic Society of Bengal on the 1st January, 1879.

ASSETS.		1878.	1877.
In the Bank of Bengal,	Rs. 7,159 10 4		2,968 2 1
Cash in hand,	57 0 2		156 14 7
Government Securities,		7,216 10 6	
Ditto Ditto on account of Piddington Pension Fund,		1,35,000 0 0	1,36,000 0 0
		500 0 0	500 0 0
		<hr/>	
	Rs., ..	1,42,716 10 6	1,39,625 0 8
<hr/>			
OUTSTANDING.			
Admission Fees,		128 0 0	96 0 0
Subscriptions,		2,215 5 0	5,874 14 0
Sale of Journal,		126 0 0	251 3 5
Subscription ditto,		197 8 0	627 15 0
Sale of Library Books,		66 5 0	224 5 0
		<hr/>	
Due by the Bank of Bengal Fund Account,		2,733 2 0	7,074 5 5
		164 13 7	164 13 7
		<hr/>	
	Total, Rs., ..	2,897 15 7	7,239 8 0
		<hr/>	
LIABILITIES.		1878.	1877.
Establishment for December, 1878,....Rs.		303 2 8	338 2 8
Dr. Stoliczka Memorial Fund,		273 7 0	329 11 2
Dr. Oldham Memorial Fund,		153 1 6	2 6 3
Blochmann Memorial Fund,		330 2 0	0 0 0
Piddington Pension Fund,		137 0 11	98 2 0
Baptist Mission Press for Printing charges of Journal, Part I, No. II of 1878,	194 0 9		
Ditto ditto Part I, No. III of 1878,	531 2 9		
Ditto ditto extra copies of ditto, 103 5 0			
Ditto ditto Part II, No. III of 1878,	239 15 0		
Ditto Proceedings, No. VIII of 1878,	62 13 0		
Ditto Notices for the Monthly General Meetings, &c.,	61 0 0		
		<hr/>	
Pandita Hurnayarayana Bhattacharjee, salary for December, 1878,		1,192 4 6	517 10 6
Jules Schaumburg, Esq., for drawing plates on stone,		20 0 0	20 0 0
Oriental Gas Co., for Gas supplied,		40 0 0	20 0 0
The Proprietor, Calcutta Advertiser Press, for stationery, &c. supplied,		14 0 0	26 8 0
Mr. J. B. Norton, for repairing Gas brackets, &c.,		30 0 0	0 0 0
The Great Eastern Hotel Co., Limited, for tea and coffee for December, 1878,		6 14 0	0 0 0
		8 4 0	8 4 0
		<hr/>	
	Total, Rs., ..	2,508 4 7	1,360 12 7
		<hr/>	

Examined and checked.

J. WENTLAND.

IC. LAJDEKKER.

STATEMENT NO. 5.

Shewing the Assets and Liabilities of the Asiatic Society of Bengal, O. P. Fund, on the 1st January, 1879.

ASSETS.				LIABILITIES.			



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